DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS
George K. Burgess, Director

Weights and Measures

Nineteenth National Conference

OF REPRESENTATIVES FROM VARIOUS STATES
HELD AT THE BUREAU OF STANDARDS
WASHINGTON, D. C., MAY 25, 26, 27, AND 28, 1926

MISCELLANEOUS PUBLICATIONS, BUREAU OF STANDARDS, No. 74

DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS
GEORGE K. BURGESS, DIRECTOR

MISCELLANEOUS PUBLICATIONS—No. 74

Weights and Measures

Nineteenth National Conference

OF REPRESENTATIVES FROM VARIOUS STATES
HELD AT THE BUREAU OF STANDARDS
WASHINGTON, D. C., MAY 25, 26, 27, AND 28, 1926

PRICE 60 CENTS

Sold only by the Superintendent of Documents, Government Printing Office
Washington, D. C.

WASHINGTON
GOVERNMENT PRINTING OFFICE
1926

OFFICERS AND COMMITTEES

OFFICERS

Honorary president, SAMUEL W. STRATTON, president, Massachusetts Institute of Technology, Cambridge, Mass., and former Director of the Bureau of Standards, Washington, D. C.

(Serving during nineteenth national conference)

President, GEORGE K. BURGESS, Director, Bureau of Standards, Washington, D. C.
First vice president, THOMAS F. EGAN.[1]
Second vice president, GEORGE WARNER, chief State inspector of weights and measures, Madison, Wis.
Secretary, F. S. HOLBROOK, Bureau of Standards, Washington, D. C.
Treasurer, GEORGE F. AUSTIN, sealer of weights and measures, Detroit, Mich.

(As elected by nineteenth national conference for the ensuing year)

President, GEORGE K. BURGESS, Director, Bureau of Standards, Washington, D. C.
First vice president, GEORGE WARNER, chief State inspector of weights and measures, Madison, Wis.
Second vice president, J. HARRY FOLEY, State superintendent of weights and measures, Trenton, N. J.
Secretary, F. S. HOLBROOK, Bureau of Standards, Washington, D. C.
Treasurer, GEORGE F. AUSTIN, sealer of weights and measures, Detroit, Mich.

COMMITTEES

EXECUTIVE COMMITTEE

(As elected by nineteenth national conference)

GEORGE K. BURGESS
GEORGE WARNER
J. HARRY FOLEY
F. S. HOLBROOK
GEORGE F. AUSTIN
Ex officio.

FRED BENJAMIN, State superintendent of standards, Springfield, Ill.
WILLIAM F. CLUETT, chief deputy inspector of weights and measures, Chicago, Ill.
WILLIAM A. DALZIEL, deputy State sealer of weights and measures, Salem, Oreg.
H. N. DAVIS, deputy State commissioner of weights and measures, Montpelier, Vt.
THOMAS FLAHERTY, city and county sealer of weights and measures, San Francisco, Calif.
H. L. FLURRY, chief, State division of weights and measures, Montgomery, Ala.
WILLIAM FOSTER, sealer of weights and measures, Springfield, Mass.
WILLIAM F. GOODWIN, State sealer of weights, measures, and balances, Providence, R. I.
TOM F. MAHONEY, sealer of weights and measures, Chattanooga, Tenn.
EDWARD J. MARONEY, superintendent of weights and measures, New Haven, Conn.

[1] Mr. Egan, formerly Deputy Superintendent of Weights and Measures of Connecticut, retired from weights and measures work some months before the nineteenth national conference convened.

I. L. Miller, State commissioner of weights and measures, Indianapolis, Ind.
George B. Nebinger, inspector of weights and measures, Harrisburg, Pa.
William A. Payne, county sealer of weights and measures, Rochester, N. Y.
B. W. Ragland, chief, bureau of weights and measures, Richmond, Va.
George M. Roberts, superintendent of weights, measures, and markets, Washington, D. C.
A. W. Schwartz, assistant State superintendent of weights and measures, Elizabeth, N. J.
William F. Steinel, sealer of weights and measures, Milwaukee, Wis.
William F. Swoger, director, State bureau of standards, Harrisburg, Pa.
W. E. Thompson, State commissioner of weights and measures, Minneapolis, Minn.
H. A. Webster, State commissioner of weights and measures, Concord, N. H.

COMMITTEE ON SPECIFICATIONS AND TOLERANCES

(Standing committee)

F. S. Holbrook, Bureau of Standards, Washington, D. C.
William F. Cluett, chief deputy inspector of weights and measures, Chicago, Ill.
Charles M. Fuller, city and county sealer of weights and measures, Los Angeles, Calif.
A. W. Schwartz, assistant State superintendent of weights and measures, Elizabeth, N. J.
I. L. Miller, State commissioner of weights and measures, Indianapolis, Ind.

ACTING COMMITTEES FOR THE NINETEENTH NATIONAL CONFERENCE

Committee on Resolutions.—W. E. Thompson, J. H. Craig, V. A. Stovall, W. A. Payne, C. G. Haley.
Committee on Nominations.—W. F. Cluett, George Warner, J. G. Rogers, J. J. Cummings, S. T. Griffith.

OFFICIAL STENOGRAPHER

Norman L. Knauss, Department of Commerce, Washington, D. C.

LIST OF PERSONS ATTENDING THE CONFERENCE

DELEGATES—STATE, COUNTY, AND CITY OFFICIALS

ALABAMA

State—H. L. Flurry, chief, division of weights and measures, Montgomery.

CALIFORNIA

City and County:
- Los Angeles—Charles M. Fuller, sealer of weights and measures, 230 Court Street, Los Angeles.
- San Francisco—Thomas Flaherty, sealer of weights and measures, room 6, City Hall, San Francisco.

COLORADO

Governor's representative, S. E. Naugle, assistant attorney general, Capitol Building, Denver.

CONNECTICUT

State—Philip T. Pilon, deputy superintendent of weights measures, State Capitol, Hartford.

County:
- Fairfield—William H. Brown, sealer of weights and measures, Courthouse, Bridgeport.
- Hartford—Milo C. Griffin, sealer of weights and measures, 225 Trumbull Street, Hartford.

City:
- Bridgeport—Dennis Kelly, sealer of weights and measures, Welfare Building.
- New Haven—Edward J. Maroney, superintendent of weights and measures, City Hall.

DELAWARE

Governor's representative, Mrs. Petricha E. Manchester, executive secretary, Consumers' League of Delaware, 816 Ford Building, Wilmington.

DISTRICT OF COLUMBIA

State—George M. Roberts, superintendent of weights, measures, and markets, District Building, Washington.
W. C. Diller, chief inspector of weights, measures, and markets, District Building, Washington.
George A. Howe, inspector of weights, measures, and markets, District Building, Washington.

ILLINOIS

State—Fred Benjamin, superintendent of standards, Springfield.

City: Chicago—William F. Cluett, chief deputy inspector of weights and measures, room 608, City Hall.

INDIANA

State—I. L. Miller, commissioner of weights and measures, 152 State House, Indianapolis.

IOWA

State — C. S. Bogle, chief record clerk, department of agriculture, State House, Des Moines.

MAINE

City: Portland — C. V. Fickett, sealer of weights and measures, room 12, City Building.

MARYLAND

State — F. B. Bomberger, chief, department of markets, College Park.
S. B. Shaw, chief inspector and specialist, department of markets, College Park.

City: Baltimore — S. T. Griffith, chief, division of weights and measures, City Hall.
Charles G. Crockett, inspector of weights and measures, City Hall.
James T. Everett, inspector of weights and measures, City Hall.
Joseph A. Guthrie, inspector of weights and measures, City Hall.
Garry Keil, inspector of weights and measures, City Hall.
Thomas J. Napfel, inspector of weights and measures, City Hall.

MASSACHUSETTS

State — John J. Cummings, acting chief inspector of standards, 194 State House, Boston.

City:
- Beverly — Robert J. Rafferty, sealer of weights and measures, City Hall.
- Cambridge — Felix C. McBride, sealer of weights and measures, City Building.
- Fall River — Daniel J. Crotty, sealer of weights and measures, room 6, City Hall Annex.
- Lowell — Warren P. Riordan, sealer of weights and measures.
- Natick — Charles H. Hollis, sealer of weights and measures.
- Newton — Andrew Prior, sealer of weights and measures, City Hall.
- Springfield — William Foster, sealer of weights and measures, room 9, City Hall.
- Waltham — Fred M. Haggarty, sealer of weights and measures.

MICHIGAN

City:
- Detroit — George F. Austin, sealer of weights and measures, 1300 Beaubien Street.
  George F. Austin, Jr., assistant supervisor, bureau of weights and measures.
- Flint — Howard R. Estes, sealer of weights and measures, 607 Beach Street.
- Highland Park — John W. Worden, sealer of weights and measures.
  H. C. Craven, sergeant of police.

MINNESOTA

State — W. E. Thompson, commissioner of weights and measures, 216 Corn Exchange, Minneapolis.
P. P. Quist, weighmaster of grain, 320 Flour Exchange, Minneapolis.

MISSOURI

City:
- St. Joseph — J. M. MARTIN, license inspector.
- St. Louis — CLIFFORD G. HALEY, commissioner of weights and measures, 407 City Hall.

NEW JERSEY

State — JOSEPH G. ROGERS, secretary, department of weights and measures, State House, Trenton.
A. W. SCHWARTZ, assistant superintendent of weights and measures, Elizabeth.

County:
- Bergen — WILLIAM H. BODINE, superintendent of weights and measures, Hackensack.
- Cape May — GILBERT S. SMITH, superintendent of weights and measures, Avalon.
- Cumberland — WILLIAM B. HOLMES, superintendent of weights and measures, Bridgeton.
- Gloucester — WILLIAM P. ABDILL, superintendent of weights and measures, Woodbury.
- Hudson — THOMAS J. WALDRON, superintendent of weights and measures, Court House, Jersey City.
- Mercer — STEPHEN G. PLANT, superintendent of weights and measures, Court House, Trenton.
- Monmouth — GLENN L. BERRY, superintendent of weights and measures, Asbury Park.
  ROBERT M. MARKS, assistant superintendent of weights and measures, Manasquan.
- Morris — HENRY S. WORMAN, superintendent of weights and measures, Boonton.
- Passaic — HARRY ROSENFELT, superintendent of weights and measures, Court House, Paterson.
- Union — ISAAC SEELEY, superintendent of weights and measures, Court House, Elizabeth.

City:
- Bayonne — WALTER J. FLYNN, superintendent of weights and measures, Municipal Building.
- Camden — GEORGE E. JOHNSON, superintendent of weights and measures.
- Elizabeth — WILLIAM J. BENDER, superintendent of weights and measures, Harmonia Building.
- Kearny — JOHN D. CASTLES, superintendent of weights and measures, Town Hall.
- Newark — P. J. CAUFIELD, superintendent of weights and measures.
- Passaic — PETER J. GALLAGHER, superintendent of weights and measures, Municipal Building.

NEW YORK

County:
- Allegany — A. W. CORWIN, sealer of weights and measures, 21 Osborn Street, Wellsville.
- Greene — ARCHIE D. CLOW, sealer of weights and measures, 251 Main Street, Catskill.
- Jefferson — CHARLES H. BULSON, sealer of weights and measures, Watertown.
- Monroe — W. A. PAYNE, sealer of weights and measures, 305 Terminal Building, Rochester.
  J. E. DUNKLEE, deputy sealer of weights and measures, 305 Terminal Building, Rochester.
- Steuben — LEONARD B. WALKER, sealer of weights and measures, Bath.
- Suffolk — C. P. SMITH, sealer of weights and measures, 96 Sound Avenue, Riverhead.

County—Continued.	
Wyoming	HERMAN O. JAHN, sealer of weights and measures, Cowlesville.
City: New York	JOSEPH P. MCKAY, commissioner, mayor's bureau of weights and measures, Municipal Building.

NORTH CAROLINA

State	GEORGE R. ROSS, chief, bureau of markets, department of Agriculture, Raleigh.
County: Guilford	W. H. BLAYLOCK, standard keeper, Guilford.

OHIO

State	J. C. TINKEY, deputy sealer of weights and measures, State House Annex, Columbus.
County:	
Champaign	J. T. WOODWARD, deputy sealer of weights and measures, Urbana.
Licking	C. R. MCFADDEN, deputy sealer of weights and measures, Pataskala.
Sandusky	K. R. RICHARDS, sealer of weights and measures, Fremont.
	CLIFFORD L. DEEMER, deputy sealer of weights and measures, Fremont.
City:	
Columbus	M. A. BRIDGE, sealer of weights and measures, 152 East Rich Street.
Newark	W. C. SEWARD, sealer of weights and measures.

OREGON

State	WILLIAM A. DALZIEL, deputy sealer of weights and measures, Salem.

PENNSYLVANIA

State	JAMES H. CRAIG, deputy secretary of internal affairs, Harrisburg.
	WILLIAM F. SWOGER, director, bureau of standards, Harrisburg.
County:	
Allegheny	THOMAS L. HOWARD, chief inspector of weights and measures, old courthouse, Pittsburgh.
Dauphin	JOHN E. BOWERS, inspector of weights and measures, 615 Kelker Street, Harrisburg.
Lancaster	JOHN A. LEINBACH, inspector of weights and measures, Lancaster.
Lehigh	HARRY E. BIERY, inspector of weights and measures, courthouse, Allentown.
Philadelphia	THEO. A. SERAPHIN, district supervisor of weights and measures, 2017 Arch Street, Philadelphia.
Venango	R. A. PRINGLE, inspector of weights and measures, 546 Grant Street, Franklin.
City:	
Allentown	B. FRANK RINN, inspector of weights and measures, City Hall.
Altoona	J. O. DE BRAY, sealer of weights and measures.
Harrisburg	G. B. NEBINGER, inspector of weights and measures, 114 Walnut Street.
Meadville	STUART D. GRAHAM, supervisor of weights and measures.

RHODE ISLAND

State	WILLIAM F. GOODWIN, sealer of weights, measures, and balances, room 20, State House, Providence.

SOUTH CAROLINA

State—Chovine Sprott, inspector of weights and measures, Columbia.

TENNESSEE

City:
- Chattanooga—Tom F. Mahoney, sealer of weights and measures, City Hall.
- Memphis—A. W. Bacegalupo, inspector of weights and measures, 45 South Front Street.

TEXAS

State—V. A. Stovall, chief inspector, division of weights and measures and public weighers, Austin.

VERMONT

State—H. N. Davis, deputy commissioner of weights and measures, Montpelier.

VIRGINIA

State—L. R. Travers, director, bureau of weights and measures, State Office Building, Richmond.

County: Nottoway—L. B. Farley, sealer of weights and measures, Blackstone.

City:
- Danville—George S. Dyer, sealer of weights and measures.
- Hopewell—F. M. Phillips, sealer of weights and measures.
- Richmond—B. W. Ragland, chief, bureau of weights and measures, 314 City Hall Annex.
  E. H. Herbin, deputy inspector of weights and measures, 314 City Hall Annex.
  Thomas W. Redford, deputy inspector of weights and measures, 314 City Hall Annex.

WEST VIRGINIA

State—P. T. Sullivan, inspector of weights and measures, Charleston.

County:
- Harrison—C. A. Chambers, sealer of weights and measures, 315 Point Street, Clarksburg.
- Jefferson—N. R. Roberts, president, county court, Charles Town.
  C. M. Kearns, sealer of weights and measures, Charles Town.
- Marion—C. E. Cunningham, sealer of weights and measures, Fairmont.

City:
- Huntington—J. S. Shafer, sealer of weights and measures, City Building.
- Wheeling—L. F. Nolte, sealer of weights and measures.

WISCONSIN

State—George Warner, chief inspector of weights and measures, Capitol Building, Madison.

City:
- Milwaukee—William F. Steinel, sealer of weights and measures, 421 Fifth Street.
- Wauwatoosa, West Allis—Erwin J. Rogers, sealer of weights and measures.

OTHER DELEGATES, AND GUESTS APPEARING ON THE PROGRAM

ANDRESEN, Hon. A. H., Member of Congress, Washington, D. C.
BEAN, H. S., Bureau of Standards, Washington, D. C.
BEARCE, H. W., Bureau of Standards, Washington, D. C.
BELL, Dr. RAYMOND, Bureau of Dairying, United States Department of Agriculture, Washington, D. C.
BRAND, Hon. CHARLES, Member of Congress, Washington, D. C.
BRIGGS, C. A., livestock weight supervisor, United States Department of Agriculture, Washington, D. C.
BURGESS, Dr. GEORGE K., Director, Bureau of Standards, Washington, D. C.
CRONIN, P. D., Solicitor's Office, United States Department of Agriculture, Washington, D. C.
GOULD, R. E., Bureau of Standards, Washington, D. C.
HOLBROOK, F. S., Bureau of Standards, Washington, D. C.
HOOVER, Hon. HERBERT, Secretary of Commerce, Washington, D. C.
JUDSON, L. V., Bureau of Standards, Washington, D. C.
MILLER, D. R., Bureau of Standards, Washington, D. C.
MOLLER, Col. I. L., traffic department, District of Columbia, Washington, D. C.
MUELLER, E. F., Bureau of Standards, Washington, D. C.
NEALE, CHARLES C., special representative, Toledo Scale Co., Toledo, Ohio.
PARRY, WILLIAM, Bureau of Standards, Washington, D. C.
PEFFER, E. L., Bureau of Standards, Washington, D. C.
PIENKOWSKY, A. T., Bureau of Standards, Washington, D. C.
ROESER, H. M., Bureau of Standards, Washington, D. C.
SMITH, RALPH W., Bureau of Standards, Washington, D. C.
SOUDER, WILMER, Bureau of Standards, Washington, D. C.

GUESTS REPRESENTING MANUFACTURERS

Allsteel Scale Co. (Inc.): HAROLD C. MITCHELL, president, 25 West Broadway, New York, N. Y.
Becker, Christian (Inc.): C. A. BECKER, 147 Eighth Street, Jersey City, N. J.
Black and Decker Manufacturing Co.:
FRED J. TROLL, manager loadometer department, Towson, Md.
EDWIN E. POWELL, traffic engineer, Towson, Md.
Bowser, S. F., & Co. (Inc.): L. E. PORTER, treasurer, Fort Wayne, Ind.
Chatillon, John, & Sons:
EDWIN C. SMITH, sales manager, 89 Cliff Street, New York, N. Y.
J. G. HUGEL, 89 Cliff Street, New York, N. Y.
Clear Vision Pump Co.: HAL M. BLACK, general counsel, Wichita, Kans.
Columbian Steel Tank Co.:
F. C. BUCHANAN, director of sales, Kansas City, Mo.
JOSEPH M. KRAMER, assistant director of sales, 1605 West One Hundred and Twenty-fifth Street, Kansas City, Mo.
Correct Measure Co.:
GEORGE W. MACKENZIE, chief engineer, Rochester, Pa.
BOYD H. LOGAN, sales representative, 17 Battery Place, New York, N. Y.
Dayton Pump & Manufacturing Co.: OLIVER HUFNAGLE, chief engineer, 500 Webster Street, Dayton, Ohio.
Dayton Scale Co.:
D. J. MOYNIHAN, vice president, Dayton, Ohio.
WILLIAM F. BOWEN, district manager, 816 Fourteenth Street, Washington, D. C.
GEORGE G. RICHMOND, manager, Jacksonville, Fla.
Dome Oil Co.:
RALPH F. PRICE, superintendent, Takoma Park, D. C.
E. G. RICKMEIER, salesman, Takoma Park, D. C.
Engineer Searching Co.: S. J. MCFARREN, Bond Building, Washington, D. C.
Fairbanks Co., The:
E. P. VROOME, 724–726 East Pratt Street, Baltimore, Md.
G. C. WORTHLEY, 416 Broome Street, New York, N. Y.
Fairbanks, Morse & Co.:
L. R. BOYER, sales engineer, 900 South Wabash Avenue, Chicago, Ill.
E. C. GOLLADAY, salesman, 900 South Wabash Avenue, Chicago, Ill.

Gilbert & Barker Manufacturing Co.:
RALPH M. LULL, sales engineer, Springfield, Mass.
J. G. O'CONOR, Springfield, Mass.
Guarantee Liquid Measure Co.:
WALTER MCADAMS, vice president, 17 Battery Place, New York, N. Y.
E. L. HAM, assistant to the president, Rochester, Pa.
PAUL ENGLE, assistant director of sales, Rochester, Pa.
Gurley, W. & L. E.:
H. M. DIBERT, secretary and treasurer, Troy, N. Y.
W. L. EGY, engineer, Troy, N. Y.
Howe Scale Co.:
MORTON H. STARR, chief engineer, Rutland, Vt.
C. A. LINDSAY, district manager, Old Colony Club, Washington, D. C.
JOHN N. FAUST, branch manager, 415 Arch Street, Philadelphia, Pa.
International Business Machines Corp.: HARRY S. EVANS, district manager, 816 Fourteenth Street, Washington, D. C.
McKenna-Horix Manufacturing Co.: H. R. WILLIAMS, secretary and manager, Pittsburgh, Pa.
Measuregraph Co.: E. A. POWELL, service manager, 3905 Belle Avenue, Baltimore, Md.
Merit Oil Equipment Co.: BOYD H. LOGAN, 17 Battery Place, New York, N. Y.
National Meter Co.:
GEORGE D. MACVEAGH, engineer, 299 Broadway, New York, N. Y.
JOHN J. MCKAGUE, 299 Broadway, New York, N. Y.
National Recording Pump Co.: J. P. HANNA, vice president, Dayton, Ohio.
National Store Specialty Co.: H. A. SHOWALTER, sales manager, Bareville, Pa.
Neptune Meter Co.: R. T. BLANCHARD, engineer, 50 East Forty-second Street, New York, N. Y.
Ohmer Fare Register Co.:
J. B. MILLS, works manager, Dayton, Ohio.
HASTINGS W. BAKER, patent attorney, Dayton, Ohio.
F. O. GRAY, chief engineer, Dayton, Ohio.
VICTOR G. FRICKE, Dayton, Ohio.
Pittsburgh Meter Co.:
T. C. CLIFFORD, sales manager, Pittsburgh, Pa.
HORACE CHRISMAN, engineeer, Pittsburgh, Pa.
Pittsburgh Taximeter Co.: JOHN W. WEIBLEY, treasurer, 530 Duquesne Way, Pittsburgh, Pa.
Seraphin Manufacturing Co.: IDA U. SERAPHIN, secretary, 1314 North Seventh Street, Philadelphia, Pa.
St. Louis Pump & Equipment Co.: HARRY D. SMITH, eastern manager, 1324 Land Title Building, Philadelphia, Pa.
Standard Computing Scale Co.: M. D. RIBBLE, supervisor of sales agencies, Detroit, Mich.
Standard Oil Co. (N. J.): OTTO W. ROSENBAUER, Washington, D. C.
Stimpson Computing Scale Co.:
W. F. STIMPSON, vice president and general manager, 811 West Market Street, Louisville, Ky.
A. J. BARTLEY, field manager, 811 West Market Street, Louisville, Ky.
Toledo Scale Co.:
H. O. HEM, consulting engineer, Toledo, Ohio.
CHARLES C. NEALE, special representative, Toledo, Ohio.
A. M. RAYMOND, sales agent, 931 New York Avenue, Washington, D. C.
Torsion Balance Co.: A. T. MILLROY, 92 Reade Street, New York, N. Y.
Triner Scale & Manufacturing Co.: JAMES M. TRINER, president and treasurer, 2714 West Twenty-first Street, Chicago, Ill.
Troemner, Henry: J. LOUIS TROEMNER, general manager, 911 Arch Street, Philadelphia, Pa.
United States Recording Instruments Corporation and United States Taximeter Corporation: A. KEENE, sales manager, 514 West Fifty-seventh Street, New York, N. Y.
Wayne Tank & Pump Co.:
R. A. DEMPSEY, district manager, 4030 North Broad Street, Philadelphia, Pa.
W. J. POWERS, salesman, 3101 Tyndale Avenue, Baltimore, Md.

GUESTS REPRESENTING RAILROADS AND WEIGHING DEPARTMENTS

ALFREY, H. H., chief scale inspector, Rock Island Railroad, El Reno, Okla.
EASLER, F. M., scale erector, Pennsylvania Railroad, Altoona, Pa.
BRENTNALL, T. E., general scale inspector, Union Pacific Railway, Denver, Colo.
BURNSIDE, R. S. superintendent of scales, Missouri, Kansas & Texas Railroad, M. K. T. Office Building, Dallas, Tex.
BYLSMA, J. M., chief, weighing department, Western Weighing and Inspection Bureau, 1800 Transportation Building, Chicago, Ill.
DEAN, T. O., superintendent of scales, Texas & Pacific Railroad, Dallas, Tex.
DUGGER, NEAL, chief scale inspector, Tennessee Coal, Iron & Railroad Co., Box 100, Ensley, Ala.
EDWARDS, C. R., supervisor of scales, Wabash Railway, Decatur, Ill.
EPRIGHT, A. W., supervisor of scales and weighing, Pennsylvania Railroad, Altoona, Pa.
HARRISON, M. J. J., general scale inspector, Pennsylvania Railroad, Chicago, Ill.
HOSFORD, C. C., general scale inspector, Pennsylvania Railroad, Room 1021, Pennsylvania Railroad Station, Pittsburgh, Pa.
KING, C. A., chief scale inspector, Western Weighing and Inspection Bureau, 1800 Transportation Building, Chicago, Ill.
LAWRENCE, E. KENT, general scale inpsector, Baltimore & Ohio Railroad, Baltimore, Md.
MANN, C. H., superintendent of scales, Southern Railway, Washington, D. C.
MARCHANT, HARRY, scale inspector, Bethlehem Steel Co., Sparrows Point, Md.
PHERIGO, J. L., chief scale inspector, Southern Railway, Washington, D. C.
SCHLINKERT, F. H., superintendent of scales, Missouri Pacific Railroad, 1055 Railway Exchange Building, St. Louis, Mo.
SCHLINKERT, WALTER E., supervisor of scales, Illinois Central Railroad, 202 North Walnut Street, Centralia, Ill.
WELLS, CLARK, scale engineer, Armour & Co., care branch house superintendent, Chicago, Ill.

OTHER GUESTS

DALE, SAMUEL S., representing American Institute of Weights and Measures, 115 Broadway, New York, N. Y.
FELL, F. B., weight supervisor, United States Department of Agriculture, 530 Livestock Exchange, South St. Paul, Minn.
FOOS, CHARLES H., 122 McPhail Street, Baltimore, Md.
FOOS, WILLIAM, 122 McPhail Street, Baltimore, Md.
GIESSEMANN, GEORGE W., Twenty-fifth Street and Haythorne Avenue, Terre Haute, Ind.
MILLER, J. C., traveling mechanician, Post Office Department, Washington, D. C.
MINNAHAN, JOHN, E., superintendent of highways, Bon Hall, New Brighton, Long Island.
NAGLE, J. W., 24 North Biddle Avenue, Wyandotte, Mich.
ROBERTS, FREDERICK L., treasurer, Metric Association, 156 Fifth Avenue, New York, N. Y.
TABBER, J. A., president, American National Bank, Lincoln, Ill.

CONTENTS

FIRST SESSION (MORNING OF TUESDAY, MAY 25, 1926)

	Page.
Opening address by the president, Dr. George K. Burgess	1
Abstracts of reports of State delegates:	
Alabama, H. L. Flurry	7
California, Charles M. Fuller and Thomas Flaherty	7
Colorado	7
Connecticut, Philip T. Pilon	7
Delaware, Mrs. Petricha E. Manchester	7
District of Columbia, George M. Roberts	7
Illinois, Fred Benjamin	8
Indiana, I. L. Miller	8
Iowa, C. S. Bogle	8
Maine, C. V. Fickett	8
Maryland, F. B. Bomberger and S. T. Griffith	8
Massachusetts, John J. Cummings	9
Michigan, Howard R. Estes	9
Minnesota, W. E. Thompson	9
Missouri, Clifford G. Haley	9
New Jersey, J. Harry Foley	10
New York	10
North Carolina	10
Ohio, J. C. Tinkey	10
Oregon, William A. Dalziel	10
Pennsylvania, William F. Swoger	10
Rhode Island, William F. Goodwin	11
South Carolina, Chovine Sprott	11
Tennessee, T. F. Mahoney	11
Texas, V. A. Stovall	11
Vermont, H. N. Davis	11
Virginia, B. W. Ragland	12
West Virginia, P. T. Sullivan	12
Wisconsin, George Warner	12

SECOND SESSION (AFTERNOON OF TUESDAY, MAY 25, 1926)

Abstracts of reports of representatives of State associations of weights and measures officials:	
Massachusetts Association of Sealers of Weights and Measures, Daniel J. Crotty	13
New York Association of Sealers of Weights and Measures, W. A. Payne	13
New Jersey Weights and Measures Association, Joseph G. Rogers	13
Wholesale sales of milk and cream, and the Babcock test, by Dr. Raymond Bell, Bureau of Dairying, United States Department of Agriculture	13
Discussion of above paper	17
Bottles for the sale of lubricating oil, by Howard R. Estes, sealer of weights and measures, city of Flint, Mich	17
Discussion of above paper	20
The gauging of fuel-oil storage tanks, by E. L. Peffer, Bureau of Standards	22
Appointment of committees	25

THIRD SESSION (MORNING OF WEDNESDAY, MAY 26, 1926)

Page

Regulatory activities of a weights and measures department, by George M. Roberts, superintendent of weights, measures, and markets, District of Columbia 26
The transmission drive for taximeters, by George F. Austin, sealer of weights and measures, city of Detroit, Mich 31
Discussion of above paper:
Remarks of A. Keene, sales manager, United States Taximeter Corporation, New York, N. Y 34
Remarks of J. B. Mills, works manager, Ohmer Fare Register Co., Dayton, Ohio 36
Remarks of John W. Weibley, treasurer, Pittsburgh Taximeter Co., Pittsburgh, Pa 36
Report of committee on specifications and tolerances on specifications and tolerances for taximeters, presented by F. S. Holbrook, chairman 38
Discussion of above report 39
Problems in livestock weighing, by C. A. Briggs, livestock weight supervisor, Packers and Stockyards Administration, United States Department of Agriculture 40
The testing of clinical thermometers:
Remarks of E. F. Mueller, Bureau of Standards 48
Remarks of J. J. Cummings, acting chief inspector of standards, State of Massachusetts, and paper prepared by J. J. Dawson, inspector of standards, State of Massachusetts 52
Insertion of official group photograph in record 56

FOURTH SESSION (AFTERNOON OF WEDNESDAY, MAY 26, 1926)

The measurement of petroleum products, by Charles M. Fuller, sealer of weights and measures, city and county of Los Angeles, Calif 57
The operation of compulsory sales-by-weight statutes:
Remarks of Fred Benjamin, superintendent of standards, State of Illinois 59
Remarks of I. L. Miller, commissioner of weights and measures, State of Indiana 61
Discussion of above papers 66
Citation by weights and measures officials of important court decisions in their jurisdictions 68
General consideration of subjects of interest brought up for discussion by delegates 72

FIFTH SESSION (MORNING OF THURSDAY, MAY 27, 1926)

Solving weights and measures problems in the South, by H. L. Flurry, chief, division of weights and measures, State of Alabama 73
Remarks of Hon. Charles Brand, Member of Congress, seventh district, Ohio 83
Training the prospective housewife, by E. L. Redfern, sealer of weights and measures, State of Iowa 86
Discussion of above paper 87
Weights and measures prosecutions, by Hon. A. H. Andresen, Member of Congress, third district, Minnesota 89
Discussion of above paper 94
The use of auxiliary automobile tanks for checking gasoline deliveries:
Remarks of Theo. A. Seraphin, district supervisor of weights and measures, city and county of Philadelphia, Pa 95

SIXTH SESSION (AFTERNOON OF THURSDAY, MAY 27, 1926)

The use of auxiliary automobile tanks for checking gasoline deliveries—Continued.
Remarks of Thomas Flaherty, sealer of weights and measures, city and county of San Francisco, Calif 99
Remarks of M. A. Bridge, sealer of weights and measures, Columbus, Ohio 101
Discussion of above papers 102

Page

Testing standards of mass (office standards and test weights), by A. T. Pienkowsky, Bureau of Standards 103
Address by the Secretary of Commerce, Hon. Herbert Hoover 116
Regulating the sale of eggs in Oregon, by William A. Dalziel, deputy sealer of weights and measures, State of Oregon 118
Discussion of above paper 120
Weighing in industry, by Charles C. Neale, special representative, Toledo Scale Co 120
Mandatory net-content marking of all commodities in package form, by James H. Craig, deputy secretary of internal affairs, State of Pennsylvania 121
Report of committee on specifications and tolerances on modification of the specifications for liquid-measuring devices, presented by F. S. Holbrook, chairman 127
Discussion of above report 127

SEVENTH SESSION (MORNING OF FRIDAY, MAY 28, 1926)

Discussion of report of the committee on specifications and tolerances on modification of the specifications for liquid-measuring devices—Continued 133
Report of committee on nominations, presented by William F. Cluett, chairman, and election of officers 145
Report of the special committee on methods of sale for ice cream, presented by A. W. Schwartz, chairman 146
Discussion of above report 147
Remarks of Thomas Hall, representing the National Association of Ice Cream Manufacturers 148
Testing methods and tolerances for portable devices designed for determining the axle loads of loaded trucks on highways:
Remarks of Col. I. L. Moller, traffic department, District of Columbia 151
Remarks of H. M. Roeser, Bureau of Standards 153
Report of committee on specifications and tolerances, presented by F. S. Holbrook, chairman 156
Announcement concerning several proposed publications of the Bureau of Standards 156
Discussion concerning specifications and tolerances for Babcock glassware 157
Report of treasurer, George F. Austin 159
Federal laws in relation to short weight in interstate commerce, by P. D. Cronin, solicitor's office, United States Department of Agriculture 160

EIGHTH SESSION (AFTERNOON OF FRIDAY, MAY 28, 1926)

Flowers in memory of Louis A. Fischer 166
Discussion of paper on Federal laws in relation to short weight in interstate commerce 166
Report of committee on resolutions, presented by W. E. Thompson, chairman:
Resolution on sales by weight 167
Resolution on net-content marking of all package goods 168
Resolution on standard hampers and baskets 168
Resolution on clinical thermometers 168
Resolution on standard-weight bread legislation 170
Resolution on lubricating-oil bottles 170
Resolution of appreciation to speakers 170
Resolution of appreciation to the press 171
Resolution of appreciation to the Secretary of Commerce and to the director and staff of the Bureau of Standards 171
Resolution in memory of George B. Moore 171
Resolution in memory of Dr. Fritz Reichmann 171
Unfinished business 172

REPORT OF THE NINETEENTH NATIONAL CONFERENCE ON WEIGHTS AND MEASURES

HELD AT THE BUREAU OF STANDARDS, WASHINGTON, D. C., MAY 25-28, 1926

FIRST SESSION (MORNING OF TUESDAY, MAY 25, 1926)

The conference was called to order at 10.45 o'clock a. m. by George Warner, second vice president of the conference.

OPENING ADDRESS BY THE PRESIDENT, DR. GEORGE K. BURGESS [2]

Before taking up the program for this, the Nineteenth National Conference on Weights and Measures, I would like to call your attention to the report of the proceedings of the eighteenth conference. I hope and I trust that all of you have now received it. Although the text was prepared in good time, it nevertheless took an unusually long time to go through the Government Printing Office and, therefore, there was this delay in your receiving it.

I think anyone looking over these proceedings of the last meeting of the conference will appreciate the splendid work that this series of meetings is doing both for your communities locally and for the country as a whole, and I trust that this meeting and succeeding meetings will be equally fruitful.

Before proceeding further I want to express my real astonishment and great appreciation, as the president of this conference, at the very large number of delegates present. I do not think I have ever before seen as many present at an opening session as there are here this morning.

It may be of some interest and importance at this time to look forward and call particular attention to several items included in our program which promise to be very helpful ones. Among these I might mention, first, the paper on "Wholesale sales of milk and cream, and the Babcock test," which will be given by Dr. Raymond Bell, of the United States Department of Agriculture. Doubtless you are all familiar with the fact that many million gallons of cream sold at wholesale throughout the country are sold, not directly by measure and not directly by weight—although the measure or the weight of the total amount delivered are necessary to be known and are always determined—but on a basis of the amount of butterfat which changes hands. Payment is made at a predetermined price per pound of this butterfat. The butterfat content of milk is also a matter of great importance and is determined by the wholesale purchaser to make sure that the fat content of the milk does not

[2] This address was delivered somewhat later in the session, but is placed here for convenience of reference.

Official photograph of delegates and guests attending the Nineteenth National Conference on Weights and Measures, assembled at the entrance of the East Building, Bureau of Standards

Now, let me say a few words in relation to the subject of exhibits of weighing and measuring devices formerly held in connection with this conference. You will remember that several years ago it appeared that manufacturers who had been regularly exhibiting their products were becoming less enthusiastic about this feature than formerly, and in consequence the exhibits were becoming somewhat less representative. To determine the facts in the case the manufacturers were polled concerning their wishes in the matter. It was developed that, while the majority of those accustomed to exhibit were prepared to continue as long as the conference desired them to do so, it seemed to be the consensus of opinion that many of them would not continue to do so on their own account. While the exhibits were always an interesting feature, we did not desire to put ourselves in the position of imposing on the manufacturers an expense which they did not consider entirely justified from the standpoint of their own interests. Consequently, the practice was abandoned and for several years no exhibit has been held.

It was our opinion that were this step to be taken it would not be long before manufacturers would be desirous of again initiating the custom of exhibiting. Apparently this time has now arrived. We have received a number of queries from manufacturers as to the proper steps to be taken for exhibiting their products at this conference, and some were distinctly disappointed when informed that no exhibits would be held. In view of this sentiment it seems that at the next conference it may again be advisable to furnish space for exhibit purposes.

I would be glad if the delegates would discuss this subject when a favorable time presents itself during the meeting. If the consensus of opinion is that the practice be again inaugurated, the character of exhibits might be discussed. We do not need to have a very large display; it might be more interesting if only new developments in apparatus were to be assigned space, since the attention of the delegates would then be focussed on apparatus with which they are not familiar, and more useful information would be gained than would be the case were their attention spread out over a much more extended line. In any event we believe that it should be especially emphasized that manufacturers participating do so solely because they are desirous that the officials have the opportunity of obtaining information in relation to their products and not because they feel in duty bound to do their part in swelling the number of pieces on display.

In my opinion the exhibit of weighing and measuring devices is an interesting and useful adjunct to the conference but is not an essential feature to the success of the meetings.

It is with great sorrow that I announce the death during the year of a man who was always a splendid partisan of honest weights and measures and one of the pioneers in our work—Dr. Fritz Reichmann. Almost all of you knew him and loved him for his many sterling qualities, his vast enthusiasm, and his untiring efforts. He was the first active superintendent of weights and measures of the State of New York and was instrumental in effecting important reforms there some 15 years ago. He was a regular attendant at these conferences and was always active in our deliberations. We

will all miss him and will deeply regret that henceforth he will be absent from our midst on the occasion of these yearly meetings.

There is another matter which has not been brought up by your president at previous meetings but which, I think, it may be well to take up at this time for your information, and that is the status of Federal legislation with respect to weights and measures.

The present Congress has been particularly active in that direction, not in the number of bills which have actually been made laws but in the number which have been discussed in committee and the number of items presented. I have listed here some 25 items. I will leave this list here with copies of all of the bills. If any person cares to have copies of hearings which have been held on any of these bills, we shall be very glad either to see that you get them before you leave the city or to send them to you by mail if you will leave with us a request to that effect.

I suppose the most fundamental bill considered has been the metric bill. As you know, for several years the metric bill has been up; Mr. Britten has introduced it into the present Congress, and it has been very thoroughly discussed in the Committee on Coinage, Weights, and Measures of the House.

Then there is the master track scale bill, authorizing the installation of the bureau's master track scale and the erection of a suitable building to house it. That bill has passed the House and has good prospects of passing the Senate.[3]

Another item in which the members of the conference may not be especially interested at this time, but which does concern you, is the standardization of screw threads. The Screw Thread Commission has had its life extended indefinitely. This is of very great value to the manufacturing interests.

Then there is a bill on commodity quantity units—"Relating to the establishment of commodity quantity units for general use in merchandising after 1935."

There are several bills on simplification of weights and measures in both the House and Senate.

Then there is House Concurrent Resolution No. 6, submitted by Mr. Vaile and referred to the Committee on Coinage, Weights, and Measures. This calls for a scientific study by the Bureau of Standards upon the general question of value and relative value and a comprehensive report on the subject to Congress with a view to removing general confusion and inequality in taxation burdens. That is, of course, a very broad subject and almost too intangible.

A bill which has just passed the Senate is that relating to the testing of clinical thermometers. You remember at the last Congress a similar bill passed the Senate making obligatory the testing by the Bureau of Standards of all clinical thermometers imported into the country or passing in interstate commerce. That bill now goes to the House.

Then we have the misbranded-article act to prevent fraud. It is H. R. 3814, introduced by Mr. Browne. The title is, "A bill to protect the public against fraud by prohibiting the manufacture,

[3] This bill later passed the Senate, and an appropriation was made for carrying out this project.

sale, or transportation in interstate commerce of misbranded, misrepresented, or falsely described articles, to regulate the traffic therein, and for other purposes." That was referred to the Committee on Interstate and Foreign Commerce.

The next bill is "To prevent the manufacture, sale, or transportation of improperly labeled or misbranded paint, turpentine, and linseed oil."

Then there is Senate bill 1618, "To prevent deceit and unfair prices that result from the unrevealed presence of substitutes for virgin wool in woven or knitted fabrics purporting to contain wool and in garments or articles of apparel made therefrom, manufactured in any Territory of the United States or the District of Columbia, or transported or intended to be transported in interstate or foreign commerce, and providing penalties for the violation of the provisions of this act, and for other purposes." That is on the Senate Calendar, and it has been discussed at some length in the Senate.

Then there is the bill to fix standards for hampers, round-stave baskets, and splint baskets for fruits and vegetables, and for other purposes. That bill was passed by the Senate and recalled by the Senate for reconsideration.

Then we have the bill introduced by Senator Capper, "To regulate in the District of Columbia the traffic in, sale, and use of milk bottles, cans, crates, and other containers of milk and cream, to prevent fraud and deception, and for other purposes."

There is also a bill introduced by Senator Curtis, "To establish the standard of weights and measures for the following wheat-mill, rye-mill, and corn-mill products, namely, flours, semolina, hominy, grits, and meals, and all commercial feeding stuffs, and for other purposes." That bill was referred to the Senate Committee on Agriculture and Forestry.

There is also another bill requiring that bread entering into interstate commerce be baked in standard-weight loaves and be wrapped or otherwise protected from contamination. You will remember that last year we discussed this question of standard weights for bread. That bill is now before the House Committee on Agriculture. The bill was introduced by Congressman Brand, of Ohio, who addressed the conference last year.

There is also a Senate bill (S. 2547), introduced by Mr. Ernst, "To protect trade-marks used in commerce, to authorize the registration of such trade-marks, and for other purposes."

That covers in a brief way a summary of the actual legislation now pending before Congress on weights and measures and related subjects.

Coming back more specifically to the items on the program, I have to announce one very important change. Mr. Hoover, Secretary of Commerce, has had to leave Washington on business, but he will be back in time to address the conference on Thursday afternoon promptly at 2 o'clock.

That, gentlemen, is all I have to say at the present time in the way of introduction, and I trust that all of the proceedings of this meeting of the conference will be as fruitful as has been the case in the past.

ABSTRACTS OF REPORTS OF STATE DELEGATES[4]

ALABAMA

(The report of H. L. Flurry, chief, State division of weights and measures, was incorporated in a paper on the program, which will be found on p. 73.)

CALIFORNIA[5]

By CHARLES M. FULLER, *Sealer of Weights and Measures, Los Angeles County, and* THOMAS FLAHERTY, *Sealer of Weights and Measures, San Francisco County*

Mr. Fuller and Mr. Flaherty commented briefly on the activities of their respective departments, which were reported as functioning in a satisfactory manner. Mr. Flaherty spoke particularly of the excellent cooperation which he is receiving from his city officials and the courts. Mr. Fuller reported successful enforcement of the standard-weight bread law, and said that no new legislation had been enacted during the past year.

COLORADO

(An official was in attendance from Colorado, but no report from this State was presented to the conference.)

CONNECTICUT

By PHILIP T. PILON, *Deputy State Superintendent of Weights and Measures*

Mr. Pilon, who succeeded T. F. Egan in February, 1926, reported an increasing interest on the part of the public and the merchants in weights and measures matters, as evidenced by the increasing number of requests for inspections received from these sources. He said that the present force of 32 county and local sealers is doing excellent work and that between it and the State division there exists the closest cooperation.

DELAWARE

By Mrs. PETRICHA E. MANCHESTER, *Official Representative of Delaware*

Mrs. Manchester stated that she represented the Women's Joint Legislative Committee of the Consumers' League of Delaware and that she had been commissioned by the governor to attend the conference to gather information which could be used in improving weights and measures conditions in that State.

DISTRICT OF COLUMBIA

By GEORGE M. ROBERTS, *Superintendent of Weights, Measures, and Markets*

Mr. Roberts reported that his department was making every effort to show progress in weights and measures supervision, but that it

[4] For convenience of reference these reports have been arranged in alphabetical order throughout.

[5] These reports were presented by Mr. Fuller and Mr. Flaherty in the absence of an official State delegate.

was laboring under a handicap on account of a shortage of men and equipment. He had hopes that by next year his force of inspectors would be increased.

ILLINOIS

By Fred Benjamin, *State Superintendent of Standards*

Mr. Benjamin spoke briefly of the general activities of his department, especially mentioning the educational work being carried on with the public. He also discussed the bill introduced into the last legislature on standard weights for bread, stating that this bill passed the lower house by a large majority, but died in the senate along with many others. This bill will be reintroduced at the next legislative session.

INDIANA

By I. L. Miller, *State Commissioner of Weights and Measures*

Mr. Miller reported that under a law passed last year the number of county sealers in Indiana would be materially increased. He stated that business interests are making more and more frequent calls upon the weights and measures officials for their services. The dry measure has been eliminated from the retail stores, and there is universal compliance with the standard-weight and labeling requirements for bread.

IOWA

By C. S. Bogle, *Chief Record Clerk, State Department of Agriculture*

Mr. Bogle reported that, following the reorganization and consolidation of State departments in Iowa in 1923, weights and measures supervision has shown great progress. More work is now being done by fewer men, and the State is being effectively covered. He particularly mentioned the improvement in the direction of full-weight coal deliveries and traced this to the reweighing activities of the inspectors.

MAINE[6]

By C. V. Fickett, *Sealer of Weights and Measures, Portland*

Reporting upon conditions in his city, Mr. Fickett said that his department was functioning as efficiently as possible under existing conditions. Two men devote their full time to weights and measures work at present. With a larger force and more extensive equipment, more effective supervision could be maintained.

MARYLAND

By F. B. Bomberger, *Chief, State Department of Markets, and* S. T. Griffith, *Chief, Division of Weights and Measures, Baltimore*

Mr. Bomberger stated that it was only during the past year that weights and measures duties had been assigned to his department,

[6] This report was presented by Mr. Fickett in the absence of an official State delegate.

and that as yet little had been done along this line, although the department has been studying the question of how best to proceed with these new duties. Mr. Griffith spoke about the efforts to secure adequate State legislation on weights and measures.

MASSACHUSETTS

By JOHN J. CUMMINGS, *Acting Chief State Inspector of Standards*

Mr. Cummings reported the recent passage of an amendment to the transient vendors law, an amendment relative to the sale of coal in paper bags and sacks, and laws regulating the sale of ice, and giving the director of standards authority to approve or disapprove of the type of commercial weighing and measuring devices. He also mentioned a pending bill designed to standardize sizes for anthracite coal, and spoke of the enforcement of the laws on clinical thermometers and leather-measuring machines.

MICHIGAN [7]

By HOWARD R. ESTES, *Sealer of Weights and Measures, Flint*

Mr. Estes reported that the State department of weights and measures is badly undermanned, an increase of 200 per cent being necessary before the maximum efficiency can be reached. Local sealers, however, are active and have an organization which meets annually for a consideration of mutual problems. No new legislation along weights and measures lines has been enacted during the past year.

MINNESOTA

By W. E. THOMPSON, *State Supervisor of Scales, Weights, and Measures*

Mr. Thompson reported a reorganization of the weights and measures department whereby this has been consolidated with the department formerly in charge of the grain-weighing scales of the State. He stated that the department was now completely motorized, and was active along all lines of weights and measures supervision. No new legislation has been enacted during the past year.

MISSOURI [8]

By CLIFFORD G. HALEY, *Commissioner of Weights and Measures, St. Louis*

Mr. Haley outlined the activities of his department during the past year, stating that special attention had been given to a survey of the gasoline filling stations and to checking up on the weights of package goods. As a result of this work a number of prosecutions have been made. Mr. Haley commented particularly on the savings to the people effected by his department and on the high percentage of convictions secured when prosecutions were instituted.

---

[7] This report was presented by Mr. Estes in the absence of an official State delegate.
[8] This report was presented by Mr. Haley in the absence of an official State delegate.

NEW JERSEY [9]

By J. Harry Foley, *State Superintendent of Weights and Measures*

Mr. Foley's report outlined the legislative program of his department but pointed out that but little success had attended efforts made during the past year to have this program enacted into law. By regulation New Jersey is now requiring manufactures to submit all new types of devices to the State department for approval. Systematic attention is given to the reweighing of commodities, with the result that last year less than 4 per cent of the reweighings showed incorrect.

NEW YORK

(Officials were in attendance from New York, but no report from this State was presented to the conference.)

NORTH CAROLINA

(Officials were in attendance from North Carolina, but no report from this State was presented to the conference.)

OHIO

By J. C. Tinkey, *Deputy State Sealer of Weights and Measures*

Mr. Tinkey outlined recent activities of his department, mentioning particularly the reweighing of package goods and the steps which had been taken to correct abuses discovered. He also told of the consistent efforts of the department to secure compliance with the specifications in the case of all types of commercial weighing and measuring devices. He announced that on May 1, W. D. Leech succeeded Arthur McWilliams as the chief of the State department of weights and measures.

OREGON

By William A. Dalziel, *Deputy State Sealer of Weights and Measures*

Mr. Dalziel discussed the lack of cooperation being experienced with some of the courts and district attorneys which amounted, he said, to a serious condition. He commented on a successful campaign being carried on by his department to secure full weight in packages put up by chain stores prior to sale, and spoke briefly on a new law establishing weight as the basis for compensation for hop pickers.

PENNSYLVANIA

By William F. Swoger, *Director, State Bureau of Standard Weights and Measures*

Mr. Swoger spoke briefly of the work accomplished during the past year in his department. In connection with his remarks on the re-

[9] This report was read to the conference by Joseph G. Rogers.

weighing of packages Mr. Swoger stated that the practice of his inspectors was to stamp the word "condemned" on all packages which were found unmarked or deficient in weight; under the law a package so marked can not be sold, and thus the package situation can be effectively controlled.

RHODE ISLAND

By WILLIAM F. GOODWIN, *State Sealer of Weights, Measures, and Balances*

Mr. Goodwin spoke of his long record of attendance at the meetings of the conference and of the benefits which he had received and expressed the conviction that these meetings have a marked influence in raising the standard of weights and measures administration throughout the country.

SOUTH CAROLINA

By CHOVINE SPROTT, *State Inspector of Weights and Measures*

Mr. Sprott reported that the present weights and measures law in his State, which was enacted in 1924, was being enforced in a satisfactory manner. He mentioned the splendid cooperation which had been afforded his department by other States as being one of the factors of the success of the work in South Carolina. No new legislation has been enacted during the past year.

TENNESSEE

By T. F. MAHONEY, *Sealer of Weights and Measures, Chattanooga*

Mr. Mahoney reported that weights-and-measures activity in the State, as a whole, was on the increase, and that the effects were now becoming apparent in the rural communities as well as in the cities. He stressed the success in his own city of his campaign to eliminate dry measures and bring about the sale of commodities on a weight basis.

TEXAS

By V. A. STOVALL, *Chief Inspector, State Division of Weights and Measures and Public Weighers*

Mr. Stovall reported the reorganization of weights-and-measures work in Texas late in 1925, when this work was placed in the department of agriculture, and the renewed activity along this line throughout the State. He said that the weighing of cotton was the biggest problem confronting the inspectors, the unknown moisture content being the troublesome factor. He outlined the plans for enlarging the weights-and-measures force and providing for additional county inspectors.

VERMONT

By H. N. DAVIS, *Deputy State Commissioner of Weights and Measures*

Mr. Davis outlined the present organization of his department which he said was seriously handicapped by lack of funds, notwithstanding an increased appropriation by the last legislature. He

stated that considerable difficulty had recently been experienced with short-weight butter and oleomargarine and acknowledged the assistance rendered by neighboring States in handling this situation. No new legislation has been enacted during the past year.

VIRGINIA [10]

By B. W. Ragland, *Chief, Bureau of Weights and Measures, Richmond*

Mr. Ragland spoke largely of the work which his bureau is doing in connection with the regulation of the quality of gasoline sold in Richmond, all of which must be inspected and approved before being offered for sale. He stated that they expected soon to have in force similar regulations with respect to lubricating oil.

WEST VIRGINIA

By P. T. Sullivan, *State Inspector of Weights and Measures*

Mr. Sullivan reported that the increased mileage of State highways and the resultant increase in the number of filling stations had necessitated the spending of an increased amount of time in the testing of gasoline-dispensing equipment. He also stated that the tests of scales at coal mines where disputes arise between miners and operators constitute a very important part of the work of the department.

WISCONSIN

By George Warner, *Chief State Inspector of Weights and Measures*

Mr. Warner stated that there had been no new legislation enacted during the past year and no changes in the number of employees in his department. He discussed in some detail the enforcement of the Wisconsin standard-weight bread law, with particular reference to the value of the tolerances to be allowed.

(At this point, at 12.45 o'clock p. m., the conference took a recess until 2.30 o'clock p. m.)

[10] In the absence of Mr. Travers this report was made by Mr. Ragland.

SECOND SESSION (AFTERNOON OF TUESDAY, MAY 25, 1926)

The conference reassembled at 2.30 o'clock p. m., Dr. George K. Burgess, president, in the chair.

ABSTRACTS OF REPORTS OF REPRESENTATIVES OF STATE ASSOCIATIONS OF WEIGHTS AND MEASURES OFFICIALS

MASSACHUSETTS ASSOCIATION OF SEALERS OF WEIGHTS AND MEASURES

By Daniel J. Crotty, *Sealer of Weights and Measures, Fall River*

Mr. Crotty spoke briefly upon the organization of his association and the character of its regular meetings. He made particular reference to the successful activities of the legislative committee and outlined new legislation which they had assisted in having enacted. He also commented upon the last meeting of the association held in Salem last fall.

NEW YORK ASSOCIATION OF SEALERS OF WEIGHTS AND MEASURES

By W. A. Payne, *Sealer of Weights and Measures, Monroe County*

Mr. Payne extended to the conference the greetings of the president of his association and issued an invitation to all weights-and-measures officials to attend the next meeting of the New York association, which will be held in Buffalo on July 21, 22, and 23.

NEW JERSEY WEIGHTS AND MEASURES ASSOCIATION

By Joseph G. Rogers, *Secretary, State Department of Weights and Measures*

Mr. Rogers spoke of the character of the meetings of his association and issued an invitation to all who might be interested to attend the next meeting, which he said would be held during the week of Labor Day.

WHOLESALE SALES OF MILK AND CREAM, AND THE BABCOCK TEST

By Dr. Raymond Bell, *Bureau of Dairying, United States Department of Agriculture*

When the cities of this country became so large that the consumers could no longer obtain their milk supply direct from the milk producers, the need for a method for determining the composition of milk and detecting adulterations became apparent; but the demand for such a method did not become insistent until the factory system for the manufacture of butter and cheese was introduced. This system developed in this country during the years between 1850 and

1870. Previous to that time all butter and cheese were made at the homes of the milk producers.

When the milk from several farms was pooled at a central plant and made into butter or cheese, it was soon learned that the amount of these products that could be made from equal volumes of milk from different herds frequently varied widely. This fact taught both the producer and the manufacturer that there was a real need for a rapid, simple method for determining the composition of milk, and especially the fat content.

At that time the science of chemistry had developed to a point where a number of trained workers in the universities and agricultural colleges were investigating chemical problems relating to foods and agriculture. In 1885 Adams, an English chemist, published a method for determining the percentage of fat in milk. He weighed a small amount of the milk, dried it on filter paper, and extracted the fat from the dry substance with ethyl ether. The ether was evaporated, the dry fat weighed, and the percentage in the milk calculated.

In 1888 Rose published a wet-extraction method. He added ammonia and alcohol to a known weight of the milk, then extracted the fat with ethyl and petroleum ethers. The ethers were then evaporated and the dried fat was weighed and the percentage calculated as in the Adams method.

These methods, or modifications of them, are the most accurate that we have at present for determining the percentage of fat in milk and other dairy products. They serve well for investigational work and in food-control laboratories where the number of samples to be analyzed is not large, where skillful chemists are available, and where results do not have to be obtained in a short time. But their general application to the needs of the industry in the production and manufacturing fields involved too great an expense. Therefore, the demand continued for a simple, rapid test that could be made by an operator who was not a trained chemist.

In taking up the development of milk-fat tests it might be well to mention that in 1892 Gerber, in Switzerland, developed a successful test which is the only one used in the greater part of England and in continental countries. Tests of milk can be completed by this method in less than seven minutes, which makes it at least twice as quick as any other method yet developed. Its speed and accuracy make the test deservedly popular, and its use in North America has been increasing rapidly recently.

In making the Gerber fat test, 10 cubic centimeters of sulphuric acid, 11 cubic centimeters of milk, and 1 cubic centimeter of amyl-alcohol are placed in a special test bottle and well mixed. The bottle is centrifuged for four minutes and the percentage of fat is read by means of graduations on the neck of the bottle. A few other tests, varying more or less in detail from those described above, were developed but they were not practical enough to come into general use.

Dr. S. M. Babcock, of the Wisconsin Agricultural Experiment Station, published in Bulletin No. 24, July, 1890, the test that bears his name. It was so simple, rapid, and accurate that it soon suc-

ceeded all other tests in the United States. This test was given freely to the public, so that Doctor Babcock never got a cent out of it. It was based on the fact that strong sulphuric acid will dissolve milk solids not fat, and leave the fat free. Centrifugal force and water are used to collect and wash the free fat.

The determination of fat in cream by the Babcock method is essentially the same as that for milk. The same underlying principles are applied. In making the test for fat in cream by the Babcock method it is necessary to weigh into a cream-test bottle 9 grams of the material. Weighing insures greater accuracy. In the case of milk-fat testing the milk can be measured because it is more fluid than the cream, and very accurate results can be obtained without weighing it. Following the addition of 9 grams of water to the 9 grams of cream in the bottle comes the addition of 15 cubic centimeters of sulphuric acid. The mixture is thoroughly agitated and the process completed as in the test for fat in milk. The test for milk I will demonstrate a little later.

Let us take up briefly the methods used by different companies in arriving at the price of a hundred pounds of milk. Four factors must be considered. In the case of a local creamery where butter, cheese, or both are made, the price the farmer receives per unit weight of milk delivered depends almost entirely on its fat content and the prevailing prices for butter and cheese. Some creamery owners make a contract with the farmers at 4 or 5 cents for every pound of butter made, to handle their milk and sell it in the form of butter. Let us take an example of how that works out. Suppose a farmer delivers during a given period, say, two weeks, 10,000 pounds of milk testing 4 per cent of fat; then during that period he has delivered 400 pounds of fat. But due to overrun caused by water, salt, and materials not fat about 480 pounds of butter can be made from the 400 pounds of fat which that farmer delivered. The proprietor of the creamery sells the butter that he makes at, say, 55 cents a pound, thereby receiving $264 for the 400 pounds of butterfat. The creamery man's commission is 5 cents per pound of butter made; since he made 480 pounds of butter, that means that his commission is $24. Subtracting the commission from the $264 received from the sale of the butter leaves $240 which the farmer would receive for his 10,000 pounds of milk, and that is at the rate of $2.40 per 100 pounds of 4 per cent milk. That is a very simple case of the way that milk is bought and sold. That method was in operation more 15 to 20 years ago than it is at the present time.

Take the case of a farmer belonging to a cooperative organization where the factors of grade, class, zone, and fat differentials enter into the price paid per 100 pounds of milk. There we have something considerably more complicated. The basic price may be arrived at in conference by representatives of the farmers and by those people in the cities who are in the market for milk. The prices stated as a result of this conference are based on delivery of 100 pounds of grade B milk testing, unless otherwise specifically stated, 3 per cent of butterfat at railroad points 201 to 210 miles from the market. For zones other than the 201 to 210 mile area, the freight differential must be applied. Those farmers living beyond the 201 to 210 mile zone have deducted from the basic price

a certain amount for freight. Those farmers living a little nearer the city than 201 miles receive a little more than the basic price.

The grade to which the milk belongs refers to the quality of the milk as regards bacteria content and the sanitary conditions under which the milk was produced. Those sanitary conditions are usually controlled by inspectors appointed by the board of health of the city to which the milk or milk product is delivered. The class to which the milk is allocated refers to the outlet for the product; that is, the price the farmer gets depends on whether the milk is made into cream cheese or evaporated milk or some other by-product.

The fourth factor, and the one of most interest to the farmer, is the price paid for milk testing more than 3 per cent of fat. A correct price differential might be defined as one which will maintain the test of milk at the desired point. If the test is too high, any differential which does not cause it to decrease is too great. If the test is too low, any differential which does not cause it to increase is too low.

Regarding the high-grade cow: In many regions high production per cow has been the goal for many years. The result has been a lowering of the test. The only way this can be stopped is by paying a differential for fat which is sufficient to cover the increased cost of production. Based on the cost of producing milk valued at $2.50 per 100 pounds, a 4-cent differential is said to be about right; that is, for every one-tenth of 1 per cent greater than the basic test the producer should receive a premium of 4 cents. For example, if the price for 3 per cent milk is $2 a hundred, then milk testing 3.1 per cent fat would net the farmer $2.04. But there is no standard method for paying for milk and cream, and one can not be worked out because the method used must be applicable to the region where the milk is used.

I will give an illustration of the way the Babcock test for milk is carried on. [Beginning at this point Doctor Bell carried on a complete Babcock test of a sample of milk. The following explanations were made during the progress of this demonstration.]

Of course, it is important that the sample be well mixed in order to get a representative sample of the milk. When the farmers take the milk to the factory, a sample is usually taken every morning, and that is put into a container; at the end of a period of a week or 15 days, whichever it may be, they have a composite sample which is supposed to represent the average of the milk that was delivered during that period.

The amount of milk that is taken in the test is 17½ cubic centimeters. All the samples should be tested in duplicate. To the 17½ cubic centimeters of milk in the bottle an equal volume of sulphuric acid is added. Sulphuric acid is a very strong oxidizing agent, and when it is mixed up with the milk in the milk-test bottle the solids not fat are burned or put into solution.

Heat is generated and the temperature of the mixture in the milk-test bottle is about 200° F. or about 96° C. You can see that the contents are being burned. The sulphuric acid does not attack the fat, but it does affect all the other constituents in the bottle. One soon learns after performing the test a few times whether enough

acid has been added. The color of this [illustrating] is a little bit light, which means that I should have added a little more acid.

Normally the tester or centrifuge is run five minutes. The rate at which the bottle whirls depends upon the diameter of the centrifuge. A little warm water is now added to bring the contents of the bottle up to the neck of the bottle, and the same operation washes the fat a little, removing foreign material from it. Those of you who are near by can see that the fat has already collected in the neck of the bottle. We now whirl the bottle again. Extra centrifuging does no harm; it might make the test a little more accurate.

The second addition of water is to bring all the fat up into the graduated portion of the neck, and it will also serve the additional purpose of washing the fat and getting the foreign material out of it.

An additional centrifuging compacts the fat in the neck. You then take the readings. The top reading on the graduated portion of the neck is 6 and the lower is 0.06; that means that this particular sample of milk tests 5.04 per cent.

Are there any questions?

DISCUSSION OF ABOVE PAPER

Mr. Tinkey. Could you get the same results with an 18-gram test?

Doctor Bell. Yes; but there is no necessity for using 18 grams.

Mr. Tinkey. The Ohio law calls for 18.

Doctor Bell. In the case of cream they weigh 9 grams into the cream-test bottle. They cut out the 18-gram sample because there is no necessity for it, and it would be merely a waste of cream. It is always best to weigh the cream, because if cream contains 40 per cent of fat it is more viscous than cream containing 20 per cent of fat, and therefore if a pipette were used which was supposed to deliver 9 grams of 20 per cent cream that same pipette could hardly be used for 40 per cent cream, because in the case of 40 per cent cream more would adhere to the inside of the pipette, and therefore the tests would tend to turn out low. Just how much of an error would take place I do not know. That has all been worked out, and no doubt there is literature on it; but it is important enough so that there is no question that the cream should be weighed.

Mr. Cummings. In actual practice do you average the two readings?

Doctor Bell. You should not do it. If you find a variation, there is an error in your test and you should make another test.

BOTTLES FOR THE SALE OF LUBRICATING OIL

By Howard R. Estes, *Sealer of Weights and Measures, City of Flint, Mich.*

The sale of lubricating oils is not a new thing, as we all know, but the modern methods used in dispensing these products are the result of changing forms of transportation, which changes have largely taken place during the last thirty-odd years. It really is not such a long time since the modern oils have largely replaced the well-

known axle grease that occasionally was used by practical jokers on hammer handles, in overall pockets, and for sundry other uses.

The increased use of automobiles in our daily life has a direct bearing on the methods used in the dispensing of the necessary motor lubrication. In the early days of the automobile, and, as a matter of fact, until very recently, metal measures alone were used in the measurement and sale of motor oil. Very few important advancements are made in any activity unless there is a definite need for the change, and I believe the use of the glass bottle as an agency for the dispensing of oil is no exception to the rule, but occurred as a matter of course in the evolution of transportation facilities.

Metal measures, as used in such oil sales, have their advantages, but their disadvantages are also apparent, hence the need for something to fill the bill. Metal measures unfortunately often become dented, the amount of such denting varying with the sturdiness of construction and the material used in the measure. A dented measure is not an accurate measure and thus becomes worthless as a measuring device. Then, again, it takes a trained juggler to fill a metal measure full of oil, transport it 10 feet to a waiting motor car, and deliver it into the proper place without spilling more or less of this expensive necessity. Because of this spillage station attendants were prone to do one or the other of two things, namely, fail properly to fill the receptacle, or use a larger capacity measure for a smaller delivery, such as a 2-quart measure for a 1-quart delivery. Both of these practices are wrong.

Those of us enforcing the weights and measures laws and regulations in Michigan feel that our far-seeing State commissioner has acted wisely in promulgating a regulation which prohibits this latter practice. The regulation is worded as follows:

Cylinder oil.—Cylinder oil, when delivered, shall be in a standard liquid measure of the capacity purchased, and the capacity of the measure shall be conspicuously, legibly, and permanently indicated on the side of the measure. The indiscriminate use of receptacles of capacity differing in amount from the quantity purchased is prohibited.

Metal measures, especially when exposed to dust and dirt, easily become "gummy" and will not deliver the true capacity. The use of "bottom-exit" measures with a thumb flow control was introduced, but the ease with which fraud could be perpetrated with such measures soon made them unpopular with weights and measures officials. For these and sundry other reasons a need was felt for some other sort of device for dispensing oil which would have none of these faults and yet would be economical and accurate. It was only natural that glass containers would be used, inasmuch as glass has been used for liquids for many years.

It was my experience, and probably the experience of many other officials, to find the oil-station men turning to the most convenient glass measure readily available—the milk bottle. It satisfied the want nicely. It was a fairly accurate measure, it was easy to handle, it occupied little space, and was very convenient to empty. But it was not long before Mrs. Housewife began to get dark-colored milk in darkly stained milk bottles, which did not look as if it was colored with black from the Holstein cow's back and which, upon further investigation, tasted like Dad's garage smelled.

This resulted in the passage of local ordinances, State laws, etc., which provided that milk bottles should be used for milk only. Before the demise of the milk-bottle oil dispensary in my territory one ingenious and painstaking gasoline station proprietor tried to protect the oil which he sold to his trade so carefully that he forced a 2-inch cork down into each bottle as a stopper to keep out the dust—and incidentally he kept considerable oil out.

Next in line came the fruit jar. Because of the wide opening found on most fruit jars some device became necessary for directing the flow of oil from the bottle, and from this need came the long metal spouts, at first without a vent. As a later addition the vent was provided. The fruit-jar measure, however, while being very convenient, offered an opening for the perpetration of fraud, inasmuch as the top half inch of the container was covered by the metal spout, and therefore neither the buyer nor the seller knew if the correct quantity was being delivered. The use of fruit jars with metal spouts as oil dispensers has not been entirely eliminated at this time, and steps should be undertaken to put an end to the practice of sales by means of these devices.

From all of these objections on the part of weights and measures officers, and from the well-known fact that at least 95 per cent of our merchants are honest and want to deal correctly with their customers, and probably because of the well-founded truth that the American people are never content until they have something better, came the present styles of oil-dispensing bottles. To say that perfection has been reached would be an error, but it can be truthfully said that great improvements have been made.

It matters not what kind of measure is used, the human element must be reckoned with. In this connection I believe, however, that the errors from this cause have been greatly reduced by the new devices. Errors in capacity have been discovered in these bottles, and on one occasion it was necessary for a State department to destroy two complete carloads of bottles because they were short in measure over and above the tolerance permitted. It can be said, however, that a great improvement has been noticed in this connection recently.

A few of the important features of bottle measures might be taken up at this time. The manufacturers themselves have provided air vents on almost all types of spouts used on bottles, thus insuring a minimum of time necessary to empty a bottle. If the time element ever was important, that fact is brought out in the operation of a filling station. A motorist, out for pleasure and going nowhere in particular, will stew and fret over 10 seconds' delay in serving him. If these 10 seconds can be saved by the oil-dispensing attendant by means of a quickly draining bottle, it means money in his pocket.

Bottles should be clear in color. While not a question of measure, I believe that the use of stained or off-color glass should be discouraged, so that the consumer may more clearly see the color and quality of the oil which he is buying. It has been stated that unscrupulous dealers have strained used oil from motors and resold it as new oil. Clear-glass containers would help to eliminate such a practice.

Spouts on bottles may later be made exceptionally long, just as the old dry measure approached the appearance of a stovepipe before the practice was stopped. Long spouts might be used to cover up a short delivery caused by poor or hurried drainage.

Marks used for capacity indications should be definite and easily seen and of such a character as not to be confusing. No more than one indication should be permitted on a container. Arrow indications are sometimes found on glass containers without any definite directions near by, and the consumer may be led to believe the capacity mark is the arrow point, whereas the true capacity point is the ring above the arrow point. On this bottle, for instance [indicating bottle on table], the directions state: "Fill to line above arrow point for full quart." If those directions were not there, an attendant might fill just to the top of the arrow point, and there is about one-eighth of an inch difference. Those same directions are also on these other bottles.

The diameter of the neck of the bottle at the capacity mark very directly influences the percentage of error likely to occur in filling the bottles. It would seem that a narrow-necked bottle is to be preferred to a bottle with a wide neck for this reason.

There also exists the very important question as to whether an oil container should be manufactured to *hold* the quantity or to *deliver* the quantity indicated on the measure. After having spent some little time observing the amount of oil left in quart containers after a reasonable amount of time had been used in draining these bottles, I have reached the conclusion that oil bottles should be manufactured to deliver the amount indicated as the capacity.

It is indeed fortunate that there is a common meeting ground on which manufacturers, consumers, dispensers, and weights and measures officers may congregate to talk over questions of the importance of the one just mentioned, and I sincerely hope that the opportunity may be grasped and that this question in particular may be decided in the near future. The glass oil dispenser is here to stay for a long time, and while the total value of the products sold through this medium is only about one-tenth the total value of motor fuel sold, nevertheless the amount involved is very large and justifies the utmost care in the selection of specifications and tolerances to cover the necessary measures involved.

DISCUSSION OF ABOVE PAPER

Mr. Schwartz. Mr. Chairman, New Jersey has found it necessary to issue a regulation covering bottles used for the dispensing of lubricating oils at service stations. This was necessitated by the fact that all manner of nondescript containers were being employed, including such items as old wine and liquor decanters, Mason jars with a variety of spout attachments, milk bottles, etc., practically none of which gave a true indication of the amount represented in sales. The bottle method of dispensing lubricating oils is all right providing the right kind of container is employed. Its principal appeal is to cleanliness, and this has caused the adoption of bottles quite generally for this purpose.

When the unusual conditions developed in 1924 the State superintendent of weights and measures of New Jersey promulgated regulation No. 8 to cover the situation. Since the effective date of the regulation we have eliminated all of the undersized or spurious bottles and the regulation is working very satisfactorily.

Mr. TINKEY. Mr. President, that was a very fine paper presented by Mr. Estes. In Ohio we prohibit the milk bottle and any kind of a bottle or jar which does not measure up to the specifications. There is another thing which is worth while considering in this connection. We found about four grades of oil put up in advance of sale in bottles, and the purchaser asking for high-grade oil was as likely as not to get low grade. We have been working to get labels on the bottles to show what kinds of oil they contain, but it seems impracticable to put anything on the bottles that will remain legible. We now allow them to label the carrier.

Mr. CLUETT. I would like to ask how marking the carrier containing the oil would prevent filling the bottles from other sources?

Mr. TINKEY. That would not help the customer unless he knew about the oil. But if an inspector purchased the oil and had it analyzed and it was not what it should be then there would be a prosecution.

Mr. ESTES. Mr. Chairman, it might be mentioned that these various devices are also being used to measure alcohol and are proving very satisfactory. The little cap over the spout is used to prevent the alcohol from evaporating.

Mr. WARNER. Mr. Chairman, Mr. Estes's suggestion that the bottles be made to deliver instead of to contain is excellent; but in measuring alcohol and the various grades of oil from the same measure accuracy in delivery would be absolutely impossible. We have found that a bottle when filled about one-quarter inch above the capacity mark will deliver about 1 quart of oil, and that means that the bottle itself would have to be about 3 cubic inches oversize. Some provision, it seems to me, should be made for that, because the consuming public is not getting full quarts of oil. You can not expect the station attendant to drain a bottle for 15 minutes, and even if he did so you would not get a full quart.

Mr. DAVIS. In regard to the use of bottles, we require that the bottles must be marked with their contents; but we find that in the wintertime the oil does not readily run out of the bottle, and the purchaser does not get full measure. I have also noticed that in the summertime, when you set the bottle in the sun, the liquid will rise above the filling point. Does not the temperature have something to do with the measurement?

Mr. ESTES. That is a hobby of mine. In my locality, in the wintertime, the attendants keep the oil inside where the temperature is around 70°, so that there is really very little difference between summer or winter conditions. If kept outside the oil would congeal, so that it would take too long to deliver it.

Mr. MARONEY. In regard to the discussion from the gentleman from Ohio, if we had the flash test blown in or marked on the containers it would show the quality of the oil. With the cooperation of our Bureau of Standards and their chemists the quality of the

various oils on the market could be determined after thorough analyses.

Mr. Rogers. I am just wondering how many delegates present would have jurisdiction over quality. As far as our weights and measures department is concerned, in New Jersey we would not have any jurisdiction regarding quality.

Mr. Thompson. Mr. Chairman, I appreciated that paper very much, and I appreciate the effort to get rid of the fruit jar. In Minnesota we still find the Mason jar in use. I think you will all find it, too, more or less, perhaps, especially in the outlying districts. If it is possible to eliminate the fruit jar as a substitute for a broken bottle, that ought to be done. At present when the attendant at a filling station located at a crossroads breaks a bottle he goes downstairs and gets a fruit jar, and the customer thereafter is probably short measured. We have taken the attitude that the bottle manufacturer should serialize his product under a number and send his bottles in for calibration. One manufacturer offers the suggestion that as weights and measures officials we, perhaps, might be interested in serializing both the container and the funnel as a unit for dispensing oil. Is it not possible to standardize the threads on the bottles so that the pouring spouts would not be interchangeable with fruit jars? In our State we have four different threads on glass oil bottles, made by four different manufacturers. Now, standardization is in line with good manufacturing processes, and I am just wondering if this conference would make any recommendation along this line.

Mr. Foster. Mr. Chairman, in reply to the gentleman who has just spoken, the fruit jar is eliminated entirely as a liquid measure in Massachusetts. The specifications state what constitutes a liquid measure, and a fruit jar does not qualify.

Mr. Thompson. I fully agree; but, as I said in the first part of my remarks, that is a matter which is more easily controlled in our large centers than at outlying points. In the absence of necessary enforcement agents to throw into such territory we are confronted with a very real problem. Practically all of the station attendants know it is wrong; we bring them into court and get the fines, but that does not stop the practice.

THE GAUGING OF FUEL-OIL STORAGE TANKS

By E. L. Peffer, *Bureau of Standards*

Mr. Chairman, members of the conference, and visitors: The use of fuel oil as a means of heating the home appears to be increasing rapidly. This is indicated by the development of equipment for this purpose, the increase in the advertising that one notes in the magazines and newspapers, the inquiries received, and the installations that one sees in his community.

The equipment for this means of heating consists primarily of two parts—the burner, or the device necessary to volatilize the oil and mix it with the proper amount of air to secure satisfactory combustion, and the storage tank or tanks. This paper is not concerned with the burners, but is given in the interest of the service that

weights and measures officials may give to the users of fuel oil in connection with the delivery of correct amounts of the fuel.

The measurement of oil presents certain difficulties that are not present in the case of other fuels, such as wood or coal. Wood may be ranked, the measurement taken, and the number of cubic feet or cords determined. For approximate results coal may be measured in the bin and the cubical contents determined and this value multiplied by the weight per cubic foot of the particular grade in question will give a check on the delivery. For accurate results the coal may be reweighed after delivery has been made. Oil, however, can not be ranked or placed in a bin so that measurements can be taken, and it is therefore necessary to rely for checking purposes upon the known capacity of the container or storage tank into which the fuel is placed.

In the installations that have come under my observation the storage tank is placed either in the ground outside of the basement or in the basement at some convenient place. It is to be understood that the storage tank is not to be considered as a commercial measure, but is a container into which oil is delivered and in which it is stored for use as required by the heating equipment. The consumer is as much entitled to full measure and to have an opportunity to check this delivery as in the case of buying potatoes or milk.

I realize that on account of its many other duties and the amount of work involved in the matter under discussion it would be impossible for the weights and measures department to check all deliveries of fuel oil by inspection or to measure all of the tanks as installed. However, one of the functions of the weights and measures official is to advise the people in his jurisdiction how to check the delivery of commodities, and I believe fuel-oil storage-tank measurements are of such importance as to merit special consideration. Moreover, the weights and measures official may relieve his office of considerable work by giving instructions so that the householder may have suitable means of checking his deliveries of oil. The necessary information may readily be disseminated through the local press by means of a timely article on the types of tanks in use and suggestions as to how to measure or calibrate them.

The tanks that have come under my observation have been rectangular, cylindrical, oval, or a combination of the rectangular and cylindrical. The large tanks were found to be cylindrical and are usually placed in the ground outside of the basement. The smaller tanks are found to be of the three other types already mentioned and are placed in the basement at some convenient place. These small tanks are in many cases supplied with a gauge, the purpose of which is approximately to indicate the amount of oil in the tank; that is, full, one-half full, empty, etc. This indicator is not intended to serve as a check on the amount of fuel delivered into the tank, but merely to indicate when a new supply of fuel is needed.

The total capacity of the cylindrical tank and the rectangular tank may be readily computed if the inside dimensions are known or if the tank is available for measurement after installation has been made. In the case of the tank that is buried, the measurement of the diameter and length can not be made after installation is com-

plete; however, the information may, perhaps, be obtained from the maker or firm installing the equipment.

The product of the length, breadth, and height, in inches, divided by 231, equals the contents in gallons of a rectangular tank. If the tank is partially full of oil, the contents may be determined by the same method, in which case the depth of the oil in the tank represents the "height."

The total volume of a cylindrical tank having flat ends is determined by use of the formula

$$V=0.7854\ d^2\ L$$

Where

V=volume,
d=diameter,
L=length.

When the inside dimensions, in inches, are substituted in the formula and the computations completed, the result is the contents in cubic inches; this figure, divided by 231, equals the capacity in gallons. The contents of a partially filled horizontal cylindrical tank can also be determined by the use of tables given in some of the engineering handbooks. It is probable, however, that in this case the use of a gauge stick would be more desirable, this stick having been graduated by a volumetric method.

This volumetric method, which is applicable to all of the tanks referred to, is especially to be desired in the calibration of oval tanks or tanks of other unusual shapes where the mathematical calculations become more involved. The steps in the calibration of a tank by this method would be first to prepare a gauge stick of sufficient length to reach the bottom of the tank. The stick should be painted; an unpainted stick will not show a sharp, clear-cut line at the highest point reached by the oil, but one that is painted with black paint, without gloss, will show this point very well, indeed. The stick can be graduated by delivering into the empty tank 5 gallons, inserting the stick into the tank, withdrawing it, and placing a mark at the point indicated by the oil. Successive 5-gallon quantities can then be added, and the other operations repeated until the tank is full. Care should be taken in the graduation and use of a gauge stick to see that the end of the stick is always at the lowest point of the tank and that it is held in a vertical position. In some cases a gauge stick is supplied with the oil-burning equipment.

The use of a gauge stick is not recommended as a means of commercial measurement of oil delivered, but serves as a means of checking the delivery of oil so that the consumer may be assured within a reasonable degree of accuracy that the amount of oil received agrees with that for which he is requested to pay.

The question of the change in volume of oil with change of temperature has not been considered in this paper, inasmuch as the general practice is to ignore such volume changes in sales to the consumer. As an example of the size of this factor, one may say that for an oil of 28 to 32 A. P. I. the volume change resulting from a temperature change of 50° F. amounts to approximately 2 per cent. For complete data on volume changes reference may be made to Bureau of Standards Circular No. 154, with supplement.

In conclusion, let me say that weights and measures officials have an opportunity to be of service to users of fuel oil by giving timely advice as to methods of checking deliveries of the oil. This may be done through the local press or by any other means that seem proper to the department.

APPOINTMENT OF COMMITTEES

The CHAIRMAN. The final item on the program for this afternoon is the announcement of committees.

As the committee on resolutions the chair will appoint W. E. Thompson, of Minnesota, chairman; James H. Craig, of Pennsylvania; V. A. Stovall, of Texas; W. A. Payne, of Monroe County, N. Y.; and Clifford G. Haley, of St. Louis, Mo.

As the committee on nominations the chair will appoint W. F. Cluett, of Chicago, chairman; George Warner, of Wisconsin; Joseph G. Rogers, of New Jersey; John J. Cummings, of Massachusetts; and S. T. Griffith, of Baltimore, Md.

Mr. HOLBROOK. Mr. Chairman, I have an announcement to make on behalf of the committee on specifications and tolerances. On this table will be found a sufficient number of copies of the three committee reports, which will be presented to the conference at later sessions, to supply all persons in attendance. One of these reports is on the proposed modification of the specifications and tolerances for liquid-measuring devices; the second is the final draft of specifications and tolerances for taximeters; while the third is concerned with tolerances for portable devices designed for determining the axle load of loaded trucks on highways. You doubtless will desire to take copies of these reports with you and study them at your leisure, so that you will be familiar with the recommendations when the subjects are called up.

(Thereupon, at 4 o'clock p. m., the conference adjourned to meet at 9.30 o'clock a. m., Wednesday, May 26, 1926.)

THIRD SESSION (MORNING OF WEDNESDAY, MAY 26, 1926)

The conference reassembled at 10.18 o'clock a. m., at the Bureau of Standards, George Warner, second vice president, in the chair.

REGULATORY ACTIVITIES OF A WEIGHTS AND MEASURES DEPARTMENT

By George M. Roberts, *Superintendent of Weights, Measures, and Markets, District of Columbia*

Mr. Chairman, ladies, and gentlemen: Weights and measures laws are intended to promote fair business methods. Officials everywhere who are charged with the duty of enforcing these laws stand squarely for fair dealing and correct business practices, but in my opinion there has been a general tendency to confine the work to too narrow limits.

Much attention has been given to standardization and accuracy of instruments used for determining quantities of commodities entering into commercial transactions. It is proper that this should be done. Without standardization and accuracy of the instrumentalities used, we can not have accuracy in trade. Great praise has been earned by the Bureau of Standards staff of experts for the diligent work performed in that respect and by the numerous enforcement officials all over the country for maintaining the standards thus established.

As between the two, I believe the greater praise is due those earnest enforcement officials who have gone into the stores, the factories, and marts of trade, and the courts, and have seen to it that the principles laid down by this great bureau here have been given force and effect.

I think the director and other officials of the bureau will agree with me when I say that their painstaking work, their diligence in research and in formulation would have been far less effective without the work of State and municipal officials who have been the real soldiers who have executed the plans which the bureau has advocated.

There are, however, other things which rightfully come within the scope of activities of properly conducted weights and measures departments, and it is to them I wish to invite attention at this time.

I want to lay down the proposition that it is as important to systematize and standardize business practices of persons engaged in trade and commerce as to standardize and correct instruments they employ. It is as important to correct the faults of the man and enforce the laws governing his actions as it is to standardize his scales, his weights, his gasoline pumps, and other measures.

This can be done only by enactment and rigid enforcement of proper regulatory provisions of law. In many respects the laws need

to be broadened, and the scope of work performed by weights and measures officials should include detailed supervision of commercial transactions. It is not sufficient to say only that actual fraud shall not be perpetrated. The law should, and in many instances the law does, provide the exact methods which shall be employed in transactions. Such regulation is for the purpose of preventing that class of sharp practices which may not fall within the category of actual fraud, but which nevertheless deceive the public.

The operation of public utilities, such as telephones, railroads, street cars, and other means of transportation, are regulated on the theory that they supply a service which is necessary for public welfare and convenience, that fair competition in the public interest should be maintained, and that those operating them should deal fairly with the public. Is it not true that for similar reasons merchants who sell the necessaries of life should have their business practices regulated? It is well known that many questionable practices are indulged in by some merchants and by some manufacturers. Such practices take the form of false or misleading advertising, various forms of misrepresentation, carelessness and indifference, and other deceptive devices which injure the public and create unfair competition.

The correction of the many evils which now exist, especially in retail businesses, is a field of regulation which has not been invaded to any large extent. It offers a great opportunity for public service on the part of those engaged in the regulation of weights and measures. Of course, there is always strenuous opposition to the invasion of the field of activity I have mentioned. Regulation is always opposed by those whom it is proposed to regulate, notwithstanding that regulation may be beneficial to them. It is more than passing strange that merchants who are injured most by unfair practices of competitors are often active in opposition to regulation which would relieve them of many harassments and enable them to make reasonable profits.

The business man who indulges in questionable practices is well pleased with the weights and measures department, which confines its work to testing scales, weights, and measures. Correct apparatus does not interfere with the trade trickster. He is often most profuse in his offers of cooperation, provided you do not look too closely to his acts. I always look with suspicion upon the man who is constantly prating about wanting his scales correct. Some of the most prodigious short weighters are found among that class.

I think it may be truthfully said that the employment of questionable methods and sharp practices is the exception rather than the rule. Such practices should nevertheless be eliminated, not only because they injure customers, but because they inflict upon legitimate and honest business injury which is almost, or quite, irreparable. They produce unfair and dishonest competition, against which it is difficult for honest business to live. The abatement of sharp practices should therefore be of as much concern to the honest business man as to officials and to the public.

Questionable methods have come to be so skillfully employed that the old-time modes of cheating have practically disappeared. In their place have sprung up artifices which are more crafty. Some

of them are so cleverly devised as to bear the stamp of "experts," or so-called "business strategists." They involve great difficulty in discovery and require great diligence to abate. The ordinary purchaser is readily deceived by them. Some practices which have grown to be more or less general stamp the entire trade in which they prevail with the stigma of dishonesty and create widespread suspicion and mistrust in the public mind. I shall not attempt to mention all of the many deceptive practices employed; a few examples will suffice.

One quite prevalent method is a system of reducing the weights in retail sales by so small an amount that there is only a little cheating on each sale. A substantial aggregate, however, may be reached on a large number of sales, and the total illegal gain on the entire consumption of a city the size of Washington might appall one who has not investigated the subject. In some instances it amounts to no more than the weight of the paper in which the goods are wrapped. In others it includes the weight of wooden trays or heavy cartons, and in some cases more. To include even the weight of the paper in a sale of goods is illegal. The law provides that all sales by weight shall be by net weight.

Some cases were found where the method employed was practically as follows: Price cards including fractions of cents were displayed, or the prices quoted included such fractions. After the customer had made a selection the salesman would place the commodity on a scale and very quickly announce a total price far in excess of the proper amount for the weight delivered; usually the announced total included odd cents. The fractions and odd cents thus used readily confuse the average person in calculating the total price of the quantity delivered, and because of the doubt as to whether or not the transaction is correct, the customer hesitates to question it. An uneducated person is often unable to make the calculation at all.

A brief investigation of methods employed by some concerns in connection with sales of precious stones, made as a result of complaint of short weight, disclosed that certain concerns apparently avoid making a definite statement of the weight of diamonds offered for sale. The word "about" or other indefinite term was nearly always employed in that conenction, like "about 1 carat," or "about ½ carat." It is believed that such methods may readily mislead the ordinary buyer, because the word "about" is lost sight of and the principal statement of weight is accepted as being true.

It was also found that in some stores the same commodities were sold at one price to one class of buyers and at a higher price to a different class of buyers. One store was found selling under an individual label a commodity of every day consumption in practically every home at a price almost 20 per cent higher than that for which competitors were selling the same commodity under the regular label of the packer. Customers purchasing from the merchant who used his individual label and charged 20 per cent more thought they were receiving a product of superior quality. The fact was they could go to any one of numerous competitors and buy the same product under the packer's label for much less.

The practice of raising the price of package goods by reducing the customary quantity per package without changing the appearance of the packages is a deceptive practice resorted to by some manufacturers. Two stores, across the street from each other, were found selling at the same price per package a commodity in packages of the same appearance and produced by the same manufacturer. The packages being sold in one of the stores contained over 30 per cent less than packages of the same goods being sold at the same price by the competitor across the street. This sort of deception has been wiped out in many jurisdictions so far as bread, milk, and some other commodities are concerned. Should it not be wiped out in regard to other necessities?

One way to accomplish the desired purpose is to standardize the quantity of certain commodities contained in packages, just as the weights of bread and the sizes of milk bottles are now standardized, and to require advertisers when quoting stipulated prices per package to state the quantity in the package.

Another deceptive practice is that of stating the weight of the contents on packages and selling them by terms of measure. We recently found several concerns selling packages of goods bearing the printed statement "Net weight 12 ounces," which were being sold as a pint. As a matter of fact, the packages contained about 25 per cent less than a pint by volume measure. Much indignation was expressed by the attorney of one of the men making these sales because he was prosecuted. But, of course, that was only the bluster sometimes employed by a pettifogger.

A few other deceptive trade practices may be briefly summarized as follows:

Advertisements by grocery stores of goods at certain prices per "large can" or "large package." Such terms mislead the unthinking housewife and mean nothing.

Sales plans in which the seller's usual price is falsely represented as a special reduced price made available on some pretext for a limited time only. It is claimed that some merchants, not in Washington, of course, mark prices up instead of down when they advertise special sales of goods at prices represented as being reduced.

Use of misleading trade names calculated to create the impression that goods are manufactured from a certain material when, in fact, they are manufactured from a much cheaper and inferior material.

Use of trade names for the purpose of secreting from purchasers the real nature of materials from which goods are manufactured with a view to leading them to believe that they are made from expensive materials, without making a direct false statement.

Use of pretended exaggerated retail prices upon containers of commodities intended to be sold as bargains at lower figures.

Advertising packages of goods at uniform prices in various sections of the country or in the same city when as a matter of fact the quantities of the commodity contained in the packages are not uniform, notwithstanding that the appearances of the packages are alike.

Imitation of containers customarily associated in the public mind with standard weights of the commodity contained therein, and the

sale of such commodities in such imitation containers holding less than the regular standard quantity.

Accompanying goods sold with meaningless, illegible, or defective sales tickets.

Quoting goods at a stated price for a stated quantity and charging at a higher rate for a smaller quantity without so informing the purchaser at the time the sale is made. This method is not easily employed except in the case of charge accounts.

Operation of business establishments under fictitious names for the purpose of concealing ownership by a pretended competitor, or under the name of a former owner of known reputation for honesty for the purpose of deceiving the purchasing public into the belief that they are patronizing the former owner.

The Federal Trade Commission was established with a view to abating unfair trade practices and has accomplished much in that direction, but its activities are necessarily confined to large matters of national scope. The same practices which the Federal Trade Commission seeks to wipe out among the large concerns prevail in the retail trade among the concerns operating only within their respective localities. This is the field which should be taken care of by State and municipal officials through the operation of local laws.

The District of Columbia has a reasonably good weights and measures law. It contains provisions requiring the inspection of weighing and measuring instruments, authorizes the establishment of tolerances and specifications for such instruments, and prohibits sales of any commodity by short weight or measure. It embraces many valuable regulations in regard to business methods and practices, especially transactions involving certain basic necessities, such as bread, coal, milk, ice, fruits, vegetables, gasoline, and other commodities.

It contains provisions relating to package foods and fruit and vegetable containers, which are similar to and in certain respects more comprehensive than the Federal standard container act, the net weight provision of the Federal food and drugs act, and the Federal standard barrel act. The purpose of including these provisions in the District law was to extend to the District department of weights and measures supervisory authority over those matters in the District of Columbia.

If the department had an inspection force reasonably sufficient as to numbers and highly trained, not only in the technical branches of the work but in business practices as well, it could, under the present law, perform an invaluable public service by driving most of the questionable business practices out of the Nation's capital. But the department is confronted by the insurmountable difficulties incident to an inadequate and underpaid inspectional force.

Notwithstanding the handicaps mentioned much progress has been made. This has been accomplished by giving much attention to details. Members of the inspectional force are required to furnish to the superintendent reports in writing regarding every violation of the law coming under their observation, indicating the provision violated, and containing a recommendation as to what action, in the opinion of the inspector making the report, should be taken. If prosecution is recommended, the report must set forth the evidence

in sufficient detail to be made the basis for a memorandum which is furnished the prosecuting attorney for use in conducting the proceedings in court. These reports serve a double purpose. They afford the superintendent accurate information regarding each case which can be filed for future reference and cause the inspector to exercise painstaking care in making his investigations.

Inspectors are also furnished with a digest of the law, which they are required to have in their possession at all times for convenient reference while at work. This enables them to easily refer to the substance of any particular feature of the law without having to make a search of the entire act.

Daily reports of routine inspection work performed by each inspector also include a report of regulatory work performed in each establishment visited, including examination of general methods of conducting the business, detailed weights of packages weighed, examination of sales tickets used, statements of contents on packages, labels on bread exposed for sale, whether or not milk bottles are properly labeled with name of bottler, whether instructions regarding the law were given the proprietor, and indicating any irregularities corrected. These reports are filed in serially numbered office jackets bearing the name of the establishment to which they refer as permanent records readily accessible for reference at any future time. A summary of all work performed each day is also made up by every inspector, which gives the total of each class of work performed. These condensed reports and all reports of packages weighed are examined personally by the superintendent every day.

By this method the superintendent is kept in close touch with details of the work performed throughout the entire territory and is able to ascertain where special investigations should be made and special duties performed. Thus, the department has been able to accomplish very gratifying results under adverse circumstances.

THE TRANSMISSION DRIVE FOR TAXIMETERS

By George F. Austin, *Sealer of Weights and Measures, City of Detroit, Mich.*

Mr. President, ladies and gentlemen of the conference, I feel that it would be presumptuous on my part to attempt to enlarge on the splendid paper which was so ably presented by Ralph Smith, of the Bureau of Standards, at our last annual conference, and which so thoroughly explained the taximeter in all of its important details, setting forth the proper methods to be followed in its inspection. I also recall that there were on exhibition here several pieces of apparatus which were intended to facilitate the accuracy of the test as well as to relieve the inspector of much time and labor in arriving at his final conclusions.

It is needless to say that I am essentially in accord with the paper as presented by Mr. Smith, believing it to be complete and fair to all parties concerned and furnishing ample protection to the traveling public. However, at that time, so far as I have been able to discover, the mechanisms of all taximeters were being actuated by the revolution of the front wheel of the cab to which the meter was

attached. Since that time, or to be exact, in October, 1925, the Detroit Cab Co., of Detroit, Mich., replaced their entire equipment with 175 new cabs on which they installed taximeters with what is known as the transmission drive, which means that the taximeter assembly is actuated directly by the revolution of the transmission drive shaft and, of course, indirectly by the revolution of the rear wheels of the cab.

Considering, therefore, the front-wheel drive having the simple ratio of 8 or 10 to 1 between the cab wheel and the taximeter assembly, and consisting of a large ring gear attached to the front wheel of the cab and engaging an 8 or 10 tooth star pinion which is connected directly with the taximeter assembly by means of a flexible shaft or cable, all of which, being visible, requires only a glance from the inspector to readily determine the exact ratio to be considered in making his final determination, and then changing to the transmission or rear-wheel drive in which the various gear ratios from the cab wheel through the transmission and the propeller shaft to the taximeter drive are carefully and permanently inclosed within the housing, it is apparent that the latter method presents some new problems in taximeter inspection which we all may be required to meet.

For instance, the mean effective circumferences of tires of the same size, kind, and make will differ when they are applied to the front and to the rear wheel of a cab, due to the difference in the weight which each is required to support, and also to the difference in inflation pressures recommended by the tire manufacturers for tires of the same size and make as applied to the front and rear wheels, respectively. These details can not be overlooked by the inspector in making his determination as to the accuracy of the meter, since much depends on the size and make as well as on the pressure carried in the tires.

Some changes will be found necessary in the method used in the inspection of a meter with a transmission drive. I see no material difference in making a road test of a taximeter with a transmission or rear-wheel drive and a similar test of a meter with the usual front-wheel drive. However, in all road tests I would recommend that a carefully surveyed course of not less than 3 and preferably 5 miles, with each mile clearly designated, be used in order that an accurate check may be made of the meter indications for each successive mile traveled, for the reason that certain errors develop in the initial interval following the flag drop of a meter, over which the manufacturers, as yet, have very little control. I consider that a 1-mile or 2-mile test would be inadequate to determine the true condition of the meter.

The wheel test of a meter with a transmission drive should be conducted on much the same principle as a test made from the front wheel, with the exception that a jack is used under one end of the rear axle and one wheel is raised high enough to permit the free revolution of the wheel, while the other rear wheel remains at rest in contact with the floor. Care should be taken to securely block the stationary wheel to prevent a possible movement of the cab during the test. A bar with a shaft or cable connection centering at the hub is then securely clamped across the face of the free wheel

FIG. 1.—*Apparatus for wheel test of taximeters driven from transmission*

and connected by a flexible shaft or cable to an odometer located on a separate stand. (See fig. 1.) After the meter and odometer readings have been properly recorded, the cab wheel is set in motion, being actuated by the motive power of the cab, always remembering when making the calculation that a cab wheel thus driven through the transmission while the opposite wheel remains at rest will develop twice as many revolutions as it would if both wheels were engaged in actual road travel. In other words, if a cab is equipped with a wheel which would require 632 revolutions in order to register on the meter the fare for 1 mile in actual road travel, the same wheel, when driven through the transmission as previously described, would require 1,264 revolutions before the required fare for 1 mile would be registered on the meter.

A bench test, or a test of the taximeter head independent from its actuating mechanism, is to my mind entirely impracticable in cases where the meter is intended to be driven through the transmission, as the ratios between the cab wheel and the taximeter drive differ greatly in the various makes of cars, and changes must be made in these ratios when different sized tires are used. Hence, upon a bench test the inspector would experience grave difficulty in making a true determination of the accuracy of the meter under investigation. However, in cases such as we experienced in Detroit, where a company maintains an entire fleet of cabs of the same make and standard equipment and uses but one make of meter, we have, after a careful survey of all the gear ratios throughout the entire system, felt justified in fixing an arbitrary number of revolutions to be required for a meter head with the gear box and change gears attached, in order to speed up our inspection work. Yet I believe such inspection would be ill advised in cases where a promiscuous assortment of vehicles and meters are to be considered.

Objection has been raised against the transmission drive for taximeters, the claim being made that the chauffeur could greatly increase the earning power of his cab by spinning the rear wheels of his cab on icy and snow-covered streets. I quite agree that this spinning of the rear wheels could be accomplished, but as to the size of the inaccuracy which could thus be caused, I am unable at this time to give an opinion; yet owing to the fact that it would require 211 revolutions of the cab wheels in actual travel to register one charge unit of 10 cents on the meter, that only one wheel will slip at any one time, and that a single spinning wheel driven through the transmission would require twice as many revolutions (or 422) before it would register on the meter one unit of fare, such action would present an extraordinary condition, excite suspicion, and I do not believe could become general practice.

During the past winter, the streets in Detroit were covered with ice and sleet for approximately three months directly following the change to the transmission drive for taximeters, and not one complaint for overcharge which could be traced to slippage has been received at my office. Under these circumstances I am unable to make any recommendations as regards slippage.

Cab owners have reported that the change from the front-wheel to the transmission drive for taximeters has resulted in a saving

of hundreds of dollars in the upkeep of their service during the past six months, due to the absence of cable trouble and the laying up of their cabs during the process of repairs. It would seem that where so much benefit accrues to the cab owners through changes of this character, weights and measures officials should be slow to condemn until they can show conclusively that the system is undesirable and lends itself to the facilitation of the perpetration of fraud.

DISCUSSION OF ABOVE PAPER

REMARKS OF A. KEENE, SALES MANAGER, UNITED STATES TAXIMETER CORPORATION, NEW YORK, N. Y.

Mr. Chairman, I am here as a representative of the United States Taximeter Corporation, and I am particularly interested in the subject of transmission drives. I would like to ask Mr. Austin as to whether or not transmission drives are controlled by the transmission outlet for the speedometer?

Mr. Austin. Yes, sir; in all instances that I have encountered a special speedometer shaft is substituted with the speedometer on one end and the drive of the meter on the other end.

Mr. Keene. That would indicate, Mr. Chairman, that the saving to taximeter operators would amount to a great many thousands of dollars. The outlet for the speedometers is governed by four or five different ratios—there are only four or five different speedometers, and the gears cover from 2,500 revolutions down to 680 revolutions, I think. By employing a swivel it is a simple matter to connect the taximeter to the transmission and still allow an outlet for the speedometer, one outlet running through for the speedometer and the other at a reduced ratio running to the taximeter cable. As far as the protection of the public is concerned, it would be far greater with a direct connection to the transmission. The sealing could be more effective; it would be out of sight and no change could be made without changing the entire swivel. At the present time a kick upon the wheel, the moving of the star, or a change of the bracket causes a difference in the running and a complaint from the operator, and when you gentlemen realize that in the city of New York we spend $150,000,000 a year in taximeter fares direct, a difference of 5 per cent or of 10 per cent by manipulation of the gears—which is very simply accomplished after the inspection has been made—amounts to $15,000,000 a year that the public can be mulcted out of. That is in one city alone. In the United States it might amount to fifty or sixty million dollars. That can also be accomplished by changing the small gear in the gear boxes of the taximeters as connected at the present time. After the inspection has been made the crooked driver can take the cab off to some side street and some unscrupulous taximeter repairer can break the seal, substitute a different gear, then put on another seal, and this driver goes along and nobody knows anything about it until he is up for the next inspection.

Now we, as taximeter manufacturers, are not only interested in the sale to the operator but we are just as much interested in the protection of the public; and I ask you gentlemen to give this matter your consideration and to help us help the public.

The use of taximeters in the measuring of fares and distance is slowly coming over all the United States. It is not only in the cities but every place, and one question is as to how the public should pay. As it is in some cities to-day they are paying for zones, but that is becoming obsolete. A flat rate is obsolete in most cases. And when you get down to where you are using taximeters, paying for distance and time, then the better and safer method of installation would be by means of the transmission drive. I think the loss on the transmission drive would be far less than it is to-day on the front-wheel drive. And so I hope you gentlemen will use your efforts at home to have such legislation passed and will recommend it here.

Mr. AUSTIN. Mr. Chairman, I would like to ask the gentleman who has just spoken if he wishes to convey the idea that in a case where a taximeter driver deliberately breaks the seal or tag on the meter and changes the gears and thereby brings about a condition where the public is being defrauded he would have this conference understand that such a transaction would be in any way affected by a transmission drive?

Mr. KEENE. I will answer that by saying "Yes." In the majority of taximeters the front wheel is regulated by a gear box that sets directly under the taximeter and is connected with the front wheel by means of a flexible cable. If you are using a 34-inch tire, you use one size gear. If you use a 33-inch tire you use another gear. Those gears are very small and can be secured at the expense of perhaps 75 cents. By merely taking off two screws after the meter has passed inspection, you may take out one of the gears and insert the other and increase the fare or revenue anywhere from 25 to 40 per cent, while with a double swivel connected directly to the transmission outlet you would be required to remove the entire swivel and replace it with a new one at an expense of $5 or $6. The boys do not very often feel like spending that much. That has been our experience throughout the eastern section of the country.

Mr. AUSTIN. Doesn't the meter which is connected with the transmission drive also have this gear box which you speak of directly under the meter?

Mr. KEENE. No, sir.

Mr. AUSTIN. In all I have seen that is the case. I do not know what particular meter you have reference to, but on any meters we have encountered in the city of Detroit, which is the only place I know of using the transmission drive, there are gear boxes underneath the meters the same as in the case of the front-wheel drive, and the possibility of breaking the seal and removing and changing the gear exists with either type of connection. I am in favor of the transmission drive, but I am afraid you are giving a wrong impression.

Mr. KEENE. The swivel I have reference to would act the same as the gears in the transmission box. It would do away with the transmission box, and the swivel itself would make up that difference.

Mr. AUSTIN. If that is a special arrangement which you are advocating and talking about, it is something that I am not acquainted with.

Mr. KEENE. That would be the only safe one. I would not be in favor of adding a swivel and also retaining the gear box as the

latter would be useless. Supposing there were 1,009 revolutions of the drive shaft to a mile, there would be a reduction adjunct to that swivel which would reduce this down to whatever might be required by the taximeter in use.

REMARKS OF J. B. MILLS, WORKS MANAGER, OHMER FARE REGISTER CO., DAYTON, OHIO

Mr. Chairman, I was a little surprised to find that the manufacturers were all going to agree on the transmission drive. I represent the Ohmer Fare Register Co. We have made some tests to determine whether or not there is any difference between the results from the transmission and the front-wheel drive. We were pleased to find that there was practically no difference. We ran 15 tests of different lengths, and we find the total error amounts to four-tenths of 1 per cent. These tests were made in the summer of 1923 and not in the winter as Mr. Austin reports.

We believe that with the advent of the balloon tire slipping has been eliminated. We attribute to that fact the transmission drive, which we have to-day. It had been the opinion that the transmission drive was not accurate on account of the slipping, but the balloon tire has taken care of that to a great extent. We are also of the opinion that in the wintertime tires slide while the cab moves ahead, and we believe this will equalize the effect of spinning to some extent.

Where it is not prohibited by law, operators prefer the transmission drive, and we have sold a great many of them with our meters. We also use the transmission drive with a great many installations aside from the taximeter. With the transmission drive that we have the meter does not change; our shaft still runs 64 revolutions per mile. That means that those who already own taximeters can change to the transmission drive without necessitating a change of the gears of their meters. We have maintained a slow speed of the shaft with the transmission drive because that gives longer life to the shaft. We know that the upkeep of taxicabs and equipment will be much less with the transmission drive, as was explained. There are lower upkeep and repair costs because of the more rugged construction.

We feel that this idea is worth serious consideration. We believe that the committee on the taximeter question should go into it thoroughly, and we can promise for our company that we will make a thorough investigation and tests and at the next conference we will be prepared to give facts, and I am sure the committee will do the same.

The Ohmer Fare Co. is in favor of the transmission drive.

REMARKS OF JOHN W. WEIBLEY, TREASURER, PITTSBURGH TAXIMETER CO., PITTSBURGH, PA.

Mr. Chairman and gentlemen, you will remember that I appeared before your conference last year. The subject of the transmission drive was introduced at that time, and some opposition was developed here. You will remember I asked you to wait until we could learn more about it. At that time I had in mind the experiment

we were about to make with the Detroit Cab Co., knowing that they were about to add many new cabs and that they wanted to use transmission drives for their taximeters.

My company developed this drive. I had an open mind at that time because I did not know. We knew that some cities and some States had laws against using any drive from the rear wheel of a vehicle, but we were particularly interested in going ahead and developing this transmission drive for the Detroit Cab Co., and we have watched it very carefully during the past year. Captain Austin has told you his experience with these cabs. I need not add anything to that.

Since that time, gentlemen, I have made a trip over all Europe investigating the transmission drive on taxicabs, as well as other features of the taximeter, and I find that London, Paris, Berlin, Copenhagen—four of the large capitals of Europe—have gone to the transmission drive for taximeters. The four-wheel brake, as you know, originated in Europe. They found difficulty in operating taximeters when connected to four-wheel-brake cars, and a great many experiments were made. Finally the municipal governments of the four large capitals of Europe which I have mentioned approved the transmission drive for taximeters. Conditions have changed very much, gentlemen, with the improvement in the construction of automobiles and the introduction of larger tires. I think that slippage to-day is almost negligible. Of course, you know a driver could jack up the vehicle, and I asked one man about that and he said the man doing it would be a common thief, and he would not have anything to do with him. I think it is an uncommon practice. The transmission drive is certainly the thing for the cab operator and the customer.

Take the situation in Boston, New York, Buffalo, Cleveland, Detroit, or Chicago. During the winter months the wheels turn up the slush which sticks on the star and practically every cable in every cab is broken. In the city of Detroit, where this company is operating these cars with transmission drives, we also have hundreds of taximeters driven the other way, and while the Detroit company experienced no disturbance of service and kept its automobiles in service 24 hours a day, others with front-wheel drive were laid up with broken cables due to the freezing weather.

These are all matters that you should consider very carefully. From the standpoint of the taximeter manufacturer it means changing our equipment, new dies, new tools, doing away with old equipment, and lessening our force for service, but we can overlook that from a practical point of view. We look on it from the viewpoint of the good of the industry, and anything which will tend toward greater efficiency we stand ready to push along.

The Acting Chairman. Are there any other companies that would like to be heard from?

I think that this matter might well be referred to the committee on specifications and tolerances.

Mr. Flaherty. Mr. Chairman, I move that this matter be referred to the committee on specifications and tolerances.

(The motion was seconded, the question was taken, and the motion was agreed to.)

REPORT OF COMMITTEE ON SPECIFICATIONS AND TOLERANCES ON SPECIFICATIONS AND TOLERANCES FOR TAXIMETERS, PRESENTED BY F. S. HOLBROOK, CHAIRMAN

Mr. President and delegates, the committee on specifications and tolerances has been meeting for several days before the conference and among other things has reviewed the specifications and tolerances for taximeters as adopted last year by the conference. Some time before these meetings all manufacturers of taximeters in the United States were requested to forward all suggestions on or criticisms of the code which was adopted last year to the committee for consideration at these meetings, and an offer was made to arrange for a hearing for any company which believed that changes were necessary.

No hearings were requested, but several letters were received containing some suggestions, minor in their nature. After due consideration the committee was of the opinion that the code should be referred back to this conference for final adoption with two amendments to the tolerance section. Copies of these amendments were distributed to you yesterday. The amendments suggested do not change the meaning of the tolerances in any way, but merely change the wording in two places to make the meaning clearer and more easily understood. The committee is of the opinion that the tolerances as adopted last year might be misunderstood and desires to eliminate that possibility. The report is as follows, reference being to the mimeographed copies of the tentative code [reading]:

The specifications and tolerances tentatively adopted by the Eighteenth National Conference are recommended for final adoption, with two amendments as follows:

Page 7, section 1, subdivision (*a*), line 3: Strike out the words "in excess of 100 feet plus 2 per cent" and insert in lieu thereof the following: "in excess, of 2 per cent of the interval under test with an added tolerance of 100 feet whenever the initial interval is included in the interval under test."

Page 7, section 1, subdivision (*b*), line 3: Strike out the words "in excess of 100 feet plus 4 per cent" and insert in lieu thereof the following: "in excess, of 4 per cent of the interval under test with an added tolerance of 100 feet whenever the initial interval is included in the interval under test."

This will make the section on mileage tolerances read as follows:

1. Tolerances on mileage tests.

(*a*) *On bench test.*—With respect to the nominal number of spindle revolutions, no tolerance in deficiency and a tolerance in excess, of 2 per cent of the interval under test with an added tolerance of 100 feet whenever the initial interval is included in the interval under test.

(*b*) *On wheel and road tests.*—With respect to distance computed or actually traveled, no tolerance in deficiency and a tolerance in excess, of 4 per cent of the interval under test with an added tolerance of 100 feet whenever the initial interval is included in the interval under test: *Provided, however,* That on a road test if the vehicle tires are obviously worn a tolerance in deficiency of 1 per cent shall be allowed.

Respectfully submitted.

(Signed) F. S. Holbrook, *Chairman*,
W. F. Cluett,
A. W. Schwartz,
C. M. Fuller,
I. L. Miller,
Committee on Specifications and Tolerances.

DISCUSSION OF ABOVE REPORT

Mr. Holbrook. The committee feels that the amended wording better expresses the idea which the conference had at the time of the adoption of the tentative report.

On the bench test it was recognized that the flat tolerance was 2 per cent throughout the interval under test. However, it is well recognized that when the flag is pulled there will usually be an added error due to some play in the mechanism and to the necessity for meshing the gears, etc., and, therefore, an added tolerance was allowed on the first interval following the flag pull. This amendment is intended to put this in language which can not be reasonably misunderstood. The second amendment is practically identical.

Therefore the committee recommends in brief that the specifications and tolerances as adopted last year be finally adopted by this conference with the two amendments clarifying the language as I have suggested.

In relation to the transmission drive, I might remark that these specifications do not forbid the transmission drive and they do not specifically recognize the transmission drive; in other words, the specifications are silent on the subject as to how taximeters should be driven. Under these specifications the transmission drive might be adopted or the front wheel drive might be adopted by the taximeter company. Of course, it is a fact that in a number of our larger cities ordinances are already in effect which specify how the taximeter shall be driven from the cab mechanism.

Mr. Cummings. Mr. Chairman, did the committee consider if it was desirable to include or exclude the initial interval at all times?

Mr. Holbrook. That is a question of the character of the test. It is possible to test the first interval and then by stopping the mechanism to test subsequent intervals without returning to zero and pulling the flag. That will be covered by the test adopted in the particular municipality in question. If the test is always made by pulling the flag, the 100 feet will always be added as a flat additional tolerance regardless of the interval. If the test is made in such a manner that the first interval is tested, and subsequent intervals are tested, then for all subsequent intervals which do not involve the movement of the flag the tolerance will be 2 or 4 per cent flat without the addition of the 100 feet.

Mr. Cummings. Why would it not be desirable to exclude the initial interval at all times?

Mr. Holbrook. Because, if the gears were in bad condition the flag pull might cause a much greater error than 100 feet, in which case you would be passing the taximeter on subsequent tests when it should be condemned on the initial test. The limitation of 100 feet must not be exceeded.

The Acting Chairman. Would you like to have the entire specification read over before you vote on the matter? If not, if there is no objection, I think we might vote on the code with the suggested amendments.

Mr. Flaherty. I move the code with the amendments suggested be adopted.

(The motion was seconded, the question was taken, and the motion was agreed to.)

PROBLEMS IN LIVESTOCK WEIGHING

By C. A. Briggs, *Livestock Weight Supervisor, Packers and Stockyards Administration, United States Department of Agriculture*

Mr. Chairman, members of the conference, ladies and gentlemen, and delegates: In order to have a paper which was not too long, I have brought with me copies of the weighing rules for livestock scales, known as "Scale Instructions No. 6," which will make it unnecessary for me to consider in detail some of our many problems in livestock weighing. Before starting my paper I will distribute these.

A few months ago the astronomers found a most amazing star in the heavens. It was composed of a material so dense that 25 tons of it could be packed in a quart milk bottle. This fact is recalled forcibly in considering the subject, "Problems in livestock weighing," which has been assigned to me. I was never before aware that so much could be packed in so few words. There is probably material for a dozen papers under this general topic. It will, therefore, be difficult to restrain the length of this discussion within useful limits without leaving out significant matters, or giving you a paper that sounds like a statistical table.

The growing of livestock is one of the largest industries in the United States. The majority of livestock produced is sold at markets known as stockyards. The sale is usually handled by an agent, who may be a commission man, or a farmers' cooperative selling organization. The animals are sold on the price-per-hundred-pounds basis. After an agreement has been reached between the buyer and the seller the animals are driven on the hoof to the scales, where they are weighed. The amount of money paid is determined by the price per hundred pounds agreed upon, times the weight determined by the scales. The scales, therefore, affect directly the returns obtained for the livestock.

At the stockyards this commodity is generally weighed by employees of the stockyards company. Most people seem to confuse the stockyards with the packers and the packing plants. It should be understood that, as a rule, the stockyards company has no direct interest in the buying or selling of the animal. The stockyards is an agency for handling the livestock at the market. They receive for their services fees known as yardage and feed charges. If the weights are not correct, it does not result in any direct loss or gain to the stockyards or to the commission man, but does affect the producer who sells the livestock, or the packer who buys it. The stockyards and commission men are, however, concerned with the general reputation of the yards, and the commission man is concerned with his particular reputation for being skillful in getting a good price for the animals he sells.

A few years ago the livestock was shipped to the stockyards in train load and carload lots, all belonging to one owner. This is now greatly changed. A carload at the present time may have half a dozen or a dozen owners. Each owner usually means a separate weighing. Also, it will interest you to learn that a very important percentage of the livestock received at some of the markets is brought

in from the surrounding territory in motor trucks. Think of what your grandfather would have said years ago if you would have told him that in 1926 the farmer would load his livestock in a horseless carriage and haul it to the market from distances that would range from 1 to 60 miles or more. At one time vast numbers of them were driven hundreds of miles to the markets or shipping points. To-day the receipts at most of the stockyards by trucks are already large and are growing. This means small lots of animals to be weighed.

As a result of conditions the average number of head per draft is quite small. In cattle weighed at some of the largest stockyards in the country, the average number of head per draft is under four. Many drafts are weighed in carload amounts but the average is brought down to the figure stated by the thousands of head which are weighed one at a time. But the weighing practices were established over three or four decades ago.

Psychological factors have a very dominating influence at the stockyards. This is met at every turn, and a proper understanding of actual conditions can not be gained until these factors are sensed, as they influence the weighing problems.

At a large market 100,000 head of animals may be received early in the morning. These are unloaded, placed in pens, and the commission and selling agencies are informed of the location of the animals in the yards and of their origin and ownership so that they can be sold. Perhaps circumstances are such that the market is slow in starting. This is determined entirely by these psychological factors; and the whole market, or divisions of a market, as, for instance, the cattle division, will partake of the same distinct tone. Finally, brisk buying starts, and in a very short time the animals are practically all sold. An amazing amount of business is done in the most informal and briefest manner conceivable. The movement to deliver starts immediately, and there is a big demand for weighing with resulting congestion. The scales are the bottle neck. Responsibility for the conditions of the animals—that is, practically the ownership—passes from the seller to the buyer at the point where the animals step off of the scale platform. However, in some instances conditions may depart widely from this, and there is the most leisurely opportunity afforded for weighing. It is not surprising, therefore, that what seems to be regarded at one market as of much importance may be of little importance at another. Conditions, habits, and ideas are frequently quite local in character; moreover, they are subject to revision.

For instance, at one market a weighing charge was applied to the animals sold. In some cases this amounted to 2 cents per head. This corresponded to the value of from 3 to 4 ounces in the weight. This fee was protested very seriously, and there was a great agitation about it. In having the matter explained to me by a livestock man at another stockyard, I was told that, while this charge did not appear to be a large amount, it corresponded to a great amount of money in the aggregate, and the economic conditions surrounding the business made this 2 cents per animal a thing of considerable importance to the producers. Later that day the method of handling the animals over the scales and of making the weighings at the stockyards I was

visiting were found to be unsatisfactory. There was reason to conclude that on many drafts the weight shown per head was 5 to 15 pounds less than what it should have been, which represented a loss to the producer of from 35 cents to $1.65 per head.

On bringing about changes to correct this, objections were raised. The 5 to 15 pounds loss observed was not important, according to the claim. The vital thing was to get the animals disposed of quickly; 2 cents was important in the morning, but in the afternoon 35 cents to $1.65 was not. It was naively explained that if the livestock were weighed properly it would hold up the business of the market; the thought apparently did not occur to the one explaining the matter that additional scales should have been provided long ago for handling the business properly.

Ideas vary at every turn. One hog salesman explained that he acted promptly to get his hogs sold and weighed to have the benefit of the market and so the owners would not lose through shrinkage in the weight. A few minutes later across the same alley another salesman will proudly show you a pen of hogs and emphasize that he skillfully held this lot so that they got a good fill to increase the weight, and he got a good price for his animals because he was not too anxious to sell quickly.

Livestock is one of the most-high-priced-per-pound commodities bought and sold in large quantities. It is also one of the commodities which has the greatest fluctuations in weight in a short time. A rough rule sometimes employed in defining a valuable commodity is that anything which is weighed in large amounts and is worth 1 cent a pound or more is a valuable commodity. This is chiefly due to the influence of those responsible for the weighing of grain into and out of large elevators. Where this grain is handled at the big terminal markets, many precautions for weighing and handling it have been adopted; and one of the reasons given for the detail and care exercised is stated, "Well, you should understand that the price of grain may run as high as 3 cents a pound."

In weighing livestock, however, the most inferior grades bring from 3 to 4 cents a pound, while the better grades will run 8, 10, and up to 16 cents a pound, depending upon the animals and the market. A figure of 10 cents a pound is a representative one. It is therefore easy to understand that livestock bought and sold at the stockyards and weighed on the hoof represents one of the most valuable of commodities both on the price-per-pound basis and with reference to the aggregate values involved. However, the practices in use to-day developed long ago and would strike you as peculiar.

I well remember my first contact with stockyard weighing. At the first scale observed, they appeared to be making a record of a series of zero load balances. It turned out that they were weighing drafts of hogs weighing from a hundred pounds to a few hundred pounds, on a scale having a beam of 8,000 pounds capacity. It was not necessary to move the main poise out of the zero notch, as all the weighings observed were readily obtained on the fractional poise. When inquiry was made, this was explained to be all right, as the hogs weighed were of negligible value. It was stated that they were cripples and only worth 5 cents a pound.

The next scale observed was a smaller one of a pair for weighing hogs; single animals were weighed on it and the price was higher than the figure just stated. The capacity of this scale was 20,000 pounds. The companion scale was then observed. It had a capacity of 60,000 pounds and was used for weighing carloads of hogs. It was stated that the maximum loads weighed were about 31,000 pounds. However, according to their statement, they also weighed single animals on this scale, as it was often inconvenient to have the hogs go over to the smaller one.

The next scale encountered was for weighing cattle. The capacity supplied was 120,000 pounds. While this was being observed, calves were brought and weighed on this scale and it was found that single animals, single calves, were weighed on this scale, many of them weighing under 100 pounds.

The last scale visited was a sheep scale. This was a large, roomy affair. The beam had a capacity of 100,000 pounds with 10-pound minimum divisions. It was found to be the custom to weigh single lambs on this scale, many of which would weigh only 60 pounds. Not only that, but now and then the 30-pound lambs occasionally received had to be weighed on this scale. In such cases it appeared important for those interested in the weighing of the animals, including the weighmaster, to check the results given by the scale by seeing the animal and checking the results of the scale by an estimate of the weight. The ideas of an experienced observer were apparently superior to the scale. It is of interest to note also that the highest-priced animals sold on the market at the time were those lambs, the values of which ran as high as 16 cents per pound.

In spite of all of the conditions set forth, livestock can be accurately and expeditiously weighed. There are opportunities for many changes and improvements. The vast number of animals now handled, to the mind of the speaker, and contrary to the ideas of some others, do not represent any serious obstacle. The great difficulties or problems are those of habit and fixed ideas.

After this attempt to give you an idea of conditions a few specific problems will now be discussed. In obtaining correct weights for livestock it is first necessary that the mechanical equipment be adequate. The scales must be suitable in size and in character, they must be properly arranged and installed, they must be tested and adjusted initially, and they must be maintained properly, carefully watched, and retested and corrected from time to time. Next, there enters into the matter the method for loading the scales, making the weighings, recording the weights, etc. Each one of these subjects has been a problem at some market or other.

The first problem is that of suitable scales. In explaining general conditions it has been brought out that many of the scales are too large for much of the weighing done over them.

Another one of the problems is to have the scales arranged so that the weigher at the beam can be made truly responsible for the weighing. The scale should be so placed and the building so designed that the weigher, from his position at the beam, can see what is going on out at the scale. In many yards the weigher at the beam is so placed that he knows less than anyone else what is going on out at

the platform. All his information comes from some signal or statements made by other parties. Information is often relayed to him by one or more people. The idea of dividing responsibility in the weighing in matters which should be put under the observation and control of the weigher works out no better in the weighing of livestock than it has for other things.

One problem is to secure the arrangement of the scales to facilitate proper inspection. Those of you who have followed the development of railroad track scales in the last 15 years know that the experience of persons concerned in maintaining the scales in proper weighing condition, and who have the facts derived by proper tests and instructions, has emphasized very much the importance of having the scales mounted in pits where the parts can be readily reached, examined, and cleaned. Many of the railroads have adopted as a standard the installation of their track scales in roomy pits provided with many electric lights, and where there is very ample room to walk around and inspect the parts without difficulty; and the weighmasters are required to keep the pits clean. This open-pit construction is also applied to well-installed motor truck scales. This is a result of practical experience in getting results. Railroads, in particular, do not have a general reputation of throwing away money on scales, yet they developed the modern scale pits.

In livestock scales the conditions which call for a suitable pit are much emphasized. Not only are the parts generally placed beneath the surface of the ground where the delicate knife-edges will rust readily, but the vapors present in stockyards tend to accelerate rusting, and the need for keeping the pits clean is greater. Many stockyards are located in a river bottom where the ground water is but a short distance below the surface. This increases the difficulty of getting a scale pit that can be kept clean and dry, but this difficulty is common to other scales. The matter of getting scales installed with suitable pits and with arrangements for preserving the accuracy and for facilitating the examination and the maintenance of the scales is one of the problems at the present time.

Progress has been made on the selection of scales, and the problem of finding a satisfactory arrangement of the scales has been solved. For general weighing requirements a large and a small scale should be mounted side by side. (See fig. 2.) The small scale is for single animals and the small drafts and the large scale for the larger loads. The beams are installed in a bay window in the scale office. (See fig. 3.) The smaller of two scales is between the large scale and the weigher. From an elevated position at the beam in the window the weigher can see what is going on at both scales. The beam of the large scale is mounted above the beam of the smaller one. At the last moment those handling the animals outside can divert them to either scale without taking the animals back and without holding up the business, and the weigher does not have to change his position either to see what is going on or to make the weighing.

Several yards have begun installations of this plan. At one of them it has been found advantageous to place the beams alongside of one another, so that at busy times two weighers can work together. This expedites the work at the time when pressure is greatest. It may be of interest to mention that an older arrangement of placing one

FIG. 2.—*Large and small livestock scales mounted side by side*

FIG. 3.—*Beams of large and small livestock scales in bay window of scale office*

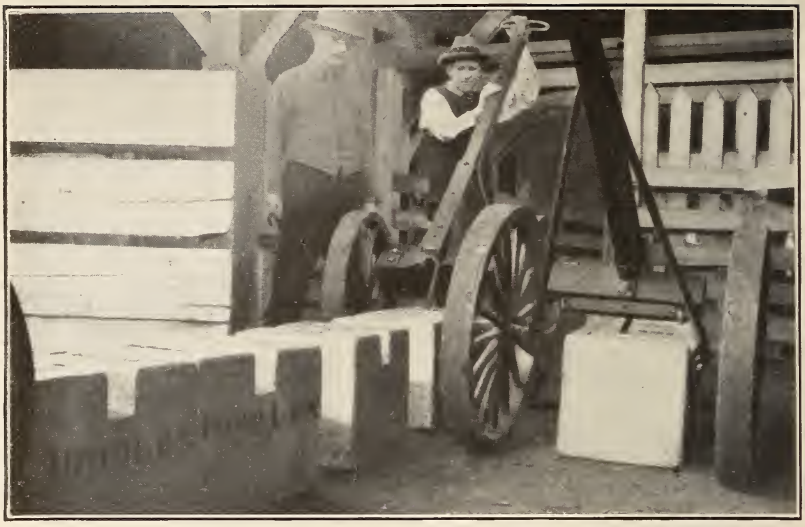

FIG. 4.—*1,000-pound test weights used in testing livestock scales*

FIG. 5.—*Moving 1,000-pound test weights with special carts*

scale on one side of the scale house and another scale on the other side of the scale house does not work out so well, as in practice it has objectionable features.

While considerable progress has been made in the scale installations, there are occasions where advantage is not taken of an opportunity to improve conditions. These situations are problems. For instance, not long ago one large stockyard, having available before it the opportunity of considering the scales and arrangements of other yards, and also having the privilege of obtaining advice respecting scales from various sources where further suggestions of value might be obtained, proceeded to install a new scale in which desirable features were ignored. No proper arrangement was provided for weighing small loads; the beam was placed in a scale house under conditions where practically the weigher had no useful view of the scale; and the scale was furnished with a shallow pit which perpetuated the difficulties of getting good scale inspection from scale men who dislike to go into livestock scale pits.

One of the vital problems relates to the duties of the weighmaster and the manner in which the scale is balanced and the weighings are made. Conditions and practices vary greatly according to the different yards. The advantages of providing a suitable and accurate scale may be readily nullified if the weighmasters are not competent; if they are not placed where they can exercise their functions properly; or if they are dishonest. This paper would be very greatly lengthened to go into this phase of the subject. However, this is unnecessary. This problem and its ramifications have been carefully studied and at the present time are pretty well covered in our Scale Instructions No. 6, "Weighing Rules for Livestock Scales." Copies of these have been distributed.

These rules are the result of situations found at some stockyards or other where things were done or conditions were present that jeopardized the weights or introduced inaccuracies. These rules point out what is right, and what procedure is needed in weighing to insure the proper use of a scale in weighing livestock. For the most part, weighing in the past done contrary to these rules can not be defended as excusable under the circumstances, as, in general, the rules point out what should have come to be followed as a consequence of common sense and experience, exercised in a desire to avoid fraud and errors in the weights. This appears to be the first compilation of its character that covers the duties of a weighmaster in so specific a manner.

The problem of maintaining the scales will be largely taken care of when suitable scales are properly installed and when provision has been made for their ready inspection and for adequate testing.

We now arrive at a problem of most direct interest to this conference both collectively and individually, and this is the proper testing of scales of large capacity. Unsatisfactory conditions in large scales are a common occurrence. This has been found in so many cases that special emphasis is justified in placing the matter before you. This is a subject of particular difficulty for us at the smaller stockyards, where the business is too small to warrant the expense of the stockyards getting scale-testing equipment of their own.

The proper testing of scales is an engineering matter for which there is no occasion for uncertainty. The tolerances provided define whether or not a scale is accurate, and proper tests will determine whether or not the scale will weigh within the tolerances. Experience shows that there is just one way in which the accuracy of heavy-capacity scales can be assured at heavy loads, and that is to test the scales at the heavy loads. Experience shows that there is just one way in which the accuracy and proper adjustment of the various parts of the scales can be assured, and that is by a test carried out in suitable detail to establish the facts.

It has been the announced policy of the Packers and Stockyards Administration to depend, in so far as is possible, upon existing agencies for the testing of livestock scales. Our main purpose is to insure the accuracy of scales by whatever means, whether the testing was under the city, State, or local scale-testing agency. The responsibilities for results are, however, eventually up to the individual stockyard companies.

However, experience gained in this work has shown that the scale-testing work generally carried out on large scales is in numerous cases unsatisfactory. Conditions may even justify the use of the term chaotic. There are exceptions, but in the situation as actually encountered with reference to large scales there is a lack of adequacy in equipment, and of thoroughness in methods. These disappointing features have been found both in the work of States or cities and in the work of commercial concerns.

Repeatedly conditions have been checked up. The scales were claimed to be carefully tested and to be maintained within proper tolerances and to be accurate. However, on testing the scales they were found inaccurate. In many cases the errors arose from conditions or defects which had apparently existed for a long time, and which had not been observed or discovered in previous tests.

For instance, one point was visited to examine the scale-testing work. The scale had been regularly tested. It had been reported to be in good condition. The records of the past tests showed that satisfactory conditions prevailed as far as the data were carried. The previous tests were made with but 2,000 pounds of test weights, which were, of course, entirely inadequate for a heavy scale. In the previous test the maximum error reported was 2 pounds. This was for 2,000-pound load on one of the sections. On proceeding to test the scale an error of minus 8 pounds was found for the 2,000-pound load where but 1-pound error had been found before. An error of minus 9 pounds was found on adding a distributed test load of 4,000 pounds when the scale was carrying an auxiliary load of approximately 12,000 pounds. However, in the sections an error of minus 19 pounds was found for the 4,000-pound test load in one of its positions.

This scale was taken out of service. An examination of the details developed that the beam was in bad condition. The main poise was found to be out three-tenths of a main notch spacing, approximately 300 pounds, in its complete run from one end of the beam to the other; and the errors in the individual positions or notches of the beams were both large and irregular. Conditions were such that the shop stated it would be almost impossible to consider cor-

recting the beams throughout. As a result, the capacity of the beam was cut down to less than half, so that it would be possible to correct the defect in the remaining portion of the beam without destroying it entirely. This defect was evidently of long standing. The indications were that the scale was inaccurate on the previous tests. The equipment was inadequate, but the care and methods used also failed to bring out even the defects that should have become apparent.

The fault for unsatisfactory scale conditions arises from inadequate tests and from unreliable test reports. I am speaking frankly on this, as the remedy for many of these bad conditions should come from you. Many of you are aware of conditions; in fact, most of you are. You tell me so. You say, "Mr. Briggs, our testing is just as good as we can do under these circumstances. We know that the small amounts of weights used on large scales do not tell very much about them, but what can we do about it? They do not give us the equipment, the time, or the men, and we have to cover so much territory every year." It is recognized that this is a difficult matter, but it is desired to insist here that you do something about it. Get equipment and improve the thoroughness of the methods in use.

To the users of scales and to the practically minded public it does not matter who looks after the testing of the scales if the scales are made and kept accurate. From an economic standpoint, however, there are good arguments for having this centralized, as in the regular scale-testing departments of States and cities, if the technical ability and competency necessary are acquired. It takes just as much equipment to test one scale of a given capacity as it takes to test a hundred of them. In small yards, where the business is not great, and where there are only one or two scales, a suitable equipment for testing the scales represents relatively a large cost. The equipment represents machinery which remains idle most of the time. Such equipment in a weights and measures department could be used in testing large scales of all kinds, most of which are not now receiving proper tests.

In this connection it will be appropriate to mention that since your conference of a year ago considerable progress has been made in the scale-testing equipment for large livestock scales. These new developments will be of interest to anyone who has a concern in the testing and accuracy of large scales.

Due to the initiative of the management of the Detroit stockyards, a very satisfactory equipment has been provided at that point. It comprises twenty-five 1,000-pound cast-iron standard weights; 2,000 pounds of 50-pound weights; and 50 or more pounds of assorted weights, which permit any desired subdivision of a load to be secured, and which are used in determining the errors of the scales. This equipment enables the scale test to be carried to the maximum capacity at which the scales are used, in this case 27,000 pounds. It is important to remember that this is done with standard test weights.

These weights are readily moved onto and off of the scales by means of light, two-wheeled carts. (See figs. 4 and 5.) Ordinarily one man can handle one weight on a cart. In the actual placing of the weights on the scale, it may be convenient for two men to assist in the work. It was originally the idea that some other wagons

would be used in moving the weights from scale to scale, but this was not found necessary as the four light carts manned by four men have been found to work out all right. These are standard weights without wheels or other complications. They can be loaded and carried from point to point in any one of a number of possible ways.

If the tolerances are too fine or small, make them larger, but make the test so as to establish the facts and proceed along different lines. Much of the scale-testing work now done is now in the horse-and-buggy stage, or even the ox-cart stage, when the present is the age of automobiles and flying machines. The care and use of an automobile require a technical knowledge which was not necessary when horses were used, and the scale testing necessary to-day is likewise a technical matter where special training and ability are required.

(At this point Mr. Briggs illustrated by means of lantern slides a number of matters discussed in his paper.)

In the foregoing I have given a recital of some of the problems of weighing livestock. Then the inaccuracies found in large scales were stressed. The unsatisfactory features have been mentioned frankly in the belief that facts were pertinent to this paper and in the hope that some benefit or progress may come from making an appeal to you for better scale-testing work. In closing let me urge that we find some way to avoid these impotent tests on large scales—tests which are deceptive—and by some means found our campaign for honest weights and measures on honest tests for scales.

THE TESTING OF CLINICAL THERMOMETERS

REMARKS OF E. F. MUELLER, BUREAU OF STANDARDS

Ladies and gentlemen, I am not going to give you a prepared paper and shall not discuss the testing of clinical thermometers particularly from the standpoint of regulation. There has been much discussion of regulation, but I shall confine myself to the subject of testing, without regard to whether such testing is to be done by the manufacturer, by a testing laboratory, or, perhaps, for the purpose of regulation.

The testing of clinical thermometers was one of the first testing services undertaken by the Bureau of Standards. In fact, the work was begun under the direction of the late Louis A. Fischer, who is remembered affectionately by the weights and measures conference. In the early work certain problems appeared which have since taken care of themselves. It was found, for example, that thermometers were in error by as much as one-half a degree or more, and that they were consistently in error, indicating that the manufacturers' standards were not correct. That situation has been entirely corrected. All manufacturers now use standards which are more than good enough for the purpose. It may be pointed out that the clinical thermometer as a thermometer makes no great demand for accuracy as compared with the accuracy attainable in thermometry. We are concerned in clinical thermometers at most with one-tenth of a degree; it is easy to get accuracy to a few hundredths of a degree. The problem is not one of thermometry as such, but one peculiar to the clinical thermometer.

The first investigation related to the question of what kind of a test should be made and also to the question of the permanence of the results. It is one thing to test a thermometer to-day and find that it is correct and satisfactory. It is an entirely different matter to say that the thermometer will remain satisfactory. The first certificates issued by the bureau, which were in use for many years, contained the statement that the thermometer at date of testing had such and such corrections. That was all that could be done at the time, and I am not sure but what that problem is still the outstanding one in the testing and in the regulation of clinical thermometers.

The bureau has been testing clinical thermometers ever since it has been organized. We have tested to date nearly 400,000 clinical thermometers. That is a comparatively small number. It represents less than 1 per cent of the number of thermometers that have been sold in the country during the interval. The test, while comparatively simple, necessitates a certain amount of knowledge and technic. From time to time we get letters from hospitals telling a very sad story. They say, "We had a large number of thermometers and we took a lot of them and put them into a glass of warm water and read them, and no two read alike." That is not so difficult to explain. We usually ask them to send the thermometers in and see whether we can verify their results. The last case I remember I think all the thermometers were satisfactory. The difficulty is this: When a bundle of thermometers is put into warm water, those on the outside are warmed first while those on the inside are protected from contact with the water until after it has been cooled, with the result that no two readings are alike. However, it is comparatively simple to make the test properly. The thermometers are put into holders, which in turn are put into a water bath. The temperature is brought up slowly to the test point. When the temperature reaches the desired point the thermometers are taken out and read. That is the custom in this country, and I believe it is the correct thing, because the clinical thermometer is essentially a maximum self-registering thermometer and is designed to register the highest temperature to which it is subjected. In both England and Germany the custom is to put the thermometer into a water bath and read the temperature while the thermometer remains in the bath. Later, a special test is made to determine the performance of the registering device. In our own procedure, which is followed, I think, generally in this country, each reading of the thermometer constitutes a separate determination of the effectiveness of the registering device, and that is important because practically all of our problems in clinical thermometry seem to center around that registering device.

In dealing with clinical thermometers we, of course, come in contact with the manufacturers. We find that the manufacturing of clinical thermometers is an old-established business; that it has customs and even a language of its own, and that it is difficult for a stranger to talk to a manufacturer of clinical thermometers because he does not understand the language, and when a thing is said it means something entirely different from the ordinary interpretation. This can be illustrated by an example.

The clinical thermometer before it is completed goes through three stages which may be completed in entirely different places, each stage, of course, involving a number of operations.

I have here a piece of annealed, enamel-backed tubing of which the stem is made. There is a separate piece of tubing of clear glass from which the bulb is made. This tube and the bulb tubing are made in the glass works and the manufacture of the tubing constitutes the first stage.

The second stage is what might be called the manufacture. It consists of welding the bulb to the glass tube, filling the bulb with a proper amount of mercury, making the constriction and closing off the end, thus finishing the thermometer in every respect except that no marks are made upon it. That, I suppose, might be described as the manufacture of the thermometer.

The last stage is that of placing the graduation marks and the various marks found on the back of the thermometer, and that might be described briefly as engraving.

The three separate stages, namely, manufacture of tubing, manufacture of thermometer, and engraving, are carried out by different manufacturers in a good many cases, and we might use the terms: "Tube maker," "manufacturer," and "engraver" to designate those who complete the several stages. In the trade, however, the work in the three stages is done by the "glass works," the "tube maker," and the "manufacturer," respectively. The term "tube" designates not a piece of tubing, but a thermometer complete except for the engraving.

If you ever have to deal with clinical thermometers it will be well to keep that in mind; and when you are dealing with clinical thermometer manufacturers you are probably dealing with people who are not manufacturers of thermometers but engravers.

Another peculiarity of the trade is the marking of one-minute. half-minute, or two-minute thermometers. These markings are used almost universally. As far as I know there is no place where the term "one-minute thermometer" can be found as a definition in print. It may be somewhere, but I have not seen it. I was told once that a one-minute thermometer was a thermometer the bulb of which would pass through a hole one-tenth of an inch in diameter. It may be said, however, that there is a general tendency to get away from such markings because they are misleading. A one-minute thermometer will take up the temperature of a water bath in about three seconds. It may give a reading of the temperature in the mouth in two minutes. Under favorable conditions it may give it in one minute, but the general tendency of people who are not familiar with thermometers is to take the marking at its face value. This practically destroys the value of any test because, in general, a one-minute thermometer will not register the mouth temperature in one minute; it depends upon conditions. The temperature of the mouth is not constant. One of our friends observed if the mouth has been in use or inadvertently left open for some time the temperature will be low and the time of registration may be three or four minutes.

In testing thermometers the matter of accuracy—that is, correctness of reading—is not the most difficult thing. It is necessary to

make tests for accuracy preferably at three or four points of the scale. It is almost as easy, not quite but nearly as easy, to put the graduation marks in the right place as somewhere else. We still have to deal with thermometers where the marks were incorrectly put on, and the instruments remain on hand and some one can make a profit by selling them, but as a rule we do not find it difficult to deal with the thermometer which reads inaccurately. Most of the difficulty we have with clinical thermometers refers to the registering device; they either are too difficult to shake down or they will not hold their readings. We test for "hard shaking" by putting the thermometers into a centrifuge and rotating them at a predetermined speed. A thermometer under this test should go down to at least 97°. The actual test we have been using requires it to go down to 95.5°, but probably a more useful test would be to rotate it at a lower speed and require it to go down to 97°.

We find in the course of the test that a certain percentage of the thermometers will not hold their readings. That is the greatest difficulty that we have with clinical thermometers—either that they will not hold their reading at the time of the test or that they will develop the defect later. If the thermometer passes all of the tests, which means briefly that it is not too easy to shake back, that it is not too hard to shake back, that it registers correctly at a number of test points, and that it has no obvious defects, then it is entitled to receive a mark or certificate indicating its correctness.

Another of the problems we have had in connection with testing thermometers has been the matter of certification. One possibility is to give a report showing the actual reading of the thermometers at the various temperatures, so that the user may, if he wishes, make allowance for the errors of a particular instrument, but as a rule no use is made of such a certificate other than taking it as a guaranty that the thermometer is all right. The other possibility is to use a blanket certificate indicating that the thermometer had met the requirements of the test. But in making such a blanket certificate the question arose as to what tolerance should be allowed. That question answers itself fairly simply. Manufacturers are agreed that a tolerance of $\pm 0.2°$ F. is practicable from a manufacturing standpoint. Physicians are agreed that errors of two-tenths of a degree are in most cases unimportant. The greatest difficulty has been that the registration of two different thermometers, each within the tolerance, when used to determine a certain body temperature, may differ by double the numerical value of the tolerance, since one thermometer may be 0.2° high and another 0.2° low, and while an error of 0.2° is unimportant, 0.4° might be important in some cases.

It is generally agreed that a tolerance of one-tenth of a degree is not practicable from a manufacturing standpoint. One way to handle the situation, then, is to provide for two classes of certificates or two classes of marks, one indicating a thermometer correct within one-tenth of a degree at least in the important part of its range, which is near the normal point, and the other indicating that it is correct within two-tenths of a degree. That system is generally satisfactory, I believe, with the single exception of the permanence of the thermometer.

There are two ways in which a thermometer may change in its characteristics after it has been made and tested. The change may

be either in the bulb or in the constriction which constitutes the maximum registering device. Changes in the bulb are very easily disposed of. If a suitable glass is used—and such glasses are known and obtainable and all manufacturers are using them, so far as we know—changes in the bulb will produce no material effect. The constriction, however, may in time change in such a way that a thermometer which was satisfactory at the time of the test later becomes what is called a "retreater" and fails to hold its indication, so that a perfectly usable thermometer at the time of test may in time become worthless. There is no way of handling this difficulty at the present time other than by aging the thermometers for a certain period before they are sold.

REMARKS OF J. J. CUMMINGS, ACTING CHIEF INSPECTOR OF STANDARDS, STATE OF MASSACHUETTS, AND PAPER PREPARED BY J. J. DAWSON, INSPECTOR OF STANDARDS, STATE OF MASSACHUSETTS [11]

Mr. Chairman, ladies and gentlemen: Massachusetts is the first and only State that by legislation has provided for the testing of clinical thermometers. The paper which I shall read was prepared by James J. Dawson, inspector of standards of our department, who is in charge of our laboratory and has had considerable experience in the testing of thermometers.

Doctor Burgess gave a list of several bills which are now pending before Congress, one of which, on clinical thermometers, has passed the Senate, and the other of which has been introduced in the House and is practically the same as the Senate bill. The question seems to have come forward. There is no question about the desirability of testing clinical thermometers. The question is as to whether it is more desirable to have that testing done by State officials or to centralize it under the control of the Bureau of Standards at Washington.

Mr. Mueller in his remarks referred to the large number of tests which have been made in Germany. In Germany all thermometers are required to be tested under governmental auspices. In that connection I might say that since the war there have been a large number of German thermometers that have entered into this country and many of them have been referred to our department for testing. I do not remember the exact figures, but I should say that we have found it necessary to reject approximately one-half of the governmental tested thermometers when they were subjected to our test.

The Bureau of Standards tests have been limited to two points, 98.6° and 104°, while we take readings at 96°, 100°, 104°, and 108°. Our experience has been such, and we have been told by manufacturers, that errors which may develop at 104 may be slight at the time, but still they may increase materially in time because of the insufficient aging of the glass, and it may be dangerous to use such a thermometer.

With these preliminary remarks I will proceed with the paper.

In 1917 the Massachusetts Legislature imposed an additional duty on the director of standards by enacting a law which was approved by the governor requiring that all clinical thermometers sold, offered, or exposed or kept for the purpose of sale must be sealed by the manufacturer under authority granted by the director, or certified

[11] This paper was read by Mr. Cummings in the absence of Mr. Dawson.

by the director after individual test of the instruments. This law also provided further that all thermometers tested by the director and found incorrect should be condemned, seized, and destroyed or returned to the owner upon satisfactory guarantee that they would not again be sold or offered for sale.

Owing to the demand placed upon manufacturers during the war it was not possible to secure the machinery necessary for testing until 1919 when the work of testing was begun. At that time letters were sent to all druggists and jobbers of druggists' sundries advising them of the law and directing them to send all unsealed thermometers in their possession to the statehouse for test. As a result, thousands of thermometers were received and the records show that a very large percentage were inaccurate.

As the work of testing and inspecting progressed several weak points were noted in the law, and in 1921 the director petitioned the legislature for an amendment to same which allowed a charge for testing, the taking of any clinical thermometer in the hands of a manufacturer, jobber, or dealer to the statehouse for test, and requiring the manufacturer securing sealing privileges to file a bond for the faithful fulfillment of an agreement signed by him to seal only thermometers conforming to specifications and tolerances promulgated by the director. With this additional power came greater efficiency and the market was rid of a large number of inaccurate thermometers that would have been dangerous to the health of many people.

As has been mentioned above there are two ways by which a manufacturer may market his product in Massachusetts. The first is by securing the authority of the director to seal thermometers manufactured in accordance with the rules and regulations and specifications and tolerances promulgated by the director, and the second is by sending all thermometers intended to be sold in Massachusetts to the director for test and certification. The first method is desired by all manufacturers and the second is accepted by those who fail to demonstrate their ability to manufacture a thermometer of the "sealed" grade. It is used also by local importers to market foreign thermometers, and, sometimes, by the manufacturer possessing sealing privileges, to market thermometers that are poorer in appearance, and less accurate than the sealed instruments.

In order for a manufacturer to secure the authority of the director to seal clinical thermometers of his manufacture he must first file an application requesting such authority and sign an agreement to the effect that all thermometers sealed by him will conform to specifications and tolerances promulgated by the director. When the application is accepted by the director the manufacturer is requested to send a number of thermometers, usually 100, for test.

Briefly this test is designed to weed out retreaters (those failing to hold their indexes); hard shakers (those failing to return below 95° on a standard test); short scales (those having more than 10° to the inch); those exceeding limits of allowable error (two-tenths of 1°); those failing to repeat their reading on a second test within two-tenths degree; those having fire cracks (due to insufficient or improper annealing or aging); those having fractured bores (due to sudden jars or falls); those whose pigment or coloring matter, used in the engraved marks, is removable by water; and those having

germ traps, twisted lens, air or gas in bulb or bore, or similar defects. Should the test evidence an ability to manufacture proper thermometers, another lot of 100 is requested, and sometimes this continues until 500 or 600 are tested.

When the manufacturer has thus demonstrated his ability to make a thermometer in accordance with the specifications and tolerances he is then asked to inform the director regarding (1) the source from which materials or blanks used are obtained, as very few manufacturers make the entire instrument, most of them buying the blank tubes from "tube makers"; (2) grade and kind of glass from which bulbs are made; (3) method of test in detail; (4) machinery used; (5) method of inspection used; (6) length of time glass is aged. If this questionnaire is satisfactorily answered, he is required to submit his standard thermometer for inspection, together with the test sheet and certificates used, and finally is required to submit two thermometers of each kind and grade upon which he desires to place the seal mark. These thermometers must be engraved in the following sequence: (1) serial number; (2) name, initials, or trademark of the manufacturer; (3) Mass Seal; (4) name of thermometer. Upon final approval of these the manufacturer files the aforementioned bond, usually in the sum of $1,000, and one set of final samples is returned to him, while the other is retained by the director for future reference.

As the sealed thermometer represents the highest type of instrument, the director saw fit to provide an outlet for a thermometer that was not quite so good in appearance, shape, or length of scale as the sealed thermometer, and allowed a three-tenths degree error at 96° and 108°. The method of test pursued in this case is as follows: The manufacturer submits any number of thermometers with an application signed by him in which he agrees that all thermometers failing to pass the test may be condemned, seized, and destroyed. When thermometers are received they are put in racks holding 25 each, and four of these racks are placed in a water bath constantly agitated by a motor-driven propeller. A clinical standard thermometer, certified by the United States Bureau of Standards, is immersed in the water and tests and readings of individual thermometers are made at 96°, 100°, 104°, and 108°. The thermometers are then "shaken down" by means of a centrifugal machine and the test duplicated at the same four points. Should any show an error greater than two-tenths of a degree at 100° or 104°, or three-tenths at 96° or 108°, or a variation greater than three-tenths of a degree between adjacent test points, or fail to repeat within three-tenths at any point, they are rejected immediately.

After the second test at the four points the thermometers are again shaken down, this time by a certain number of revolutions per minute in the centrifugal machine, and all theremometers failing to shake below 96° are rejected. Thermometers are then inspected for the presence of easy shakers, a suspicious sign of a retreater, and these are given a special test to determine their ability to hold their highest readings. When this test is completed a special test is given to determine if any air or gas is pocketed in the bulb or bore. The final inspection weeds out all others having scales too short to insure precision in reading, those having fire cracks or germ traps, those in which the pigment or coloring in engraved markings has been

removed by water, and various other minor defects affecting proper use of the instrument. Those passing tests are certified and the certificate issued bears the identification number, serial number, date of test, corrections, if any, at the four points tested, and the facsimile signature of the director.

In order to ascertain the character of thermometers on the market the inspectors representing the director periodically visit the drug stores and jobbing houses in their several districts and report in detail the number and kind of thermometers on hand. If unsealed thermometers are present, the same are taken for test and prosecution sometimes follows. At various times a number of sealed thermometers are taken from jobbers for test to determine whether or not the manufacturer is fulfilling his agreement to market only thermometers conforming with his approved samples.

Occasionally rumors are received by the director to the effect that manufacturers are sending properly sealed thermometers to Massachusetts, while sealing inferior instruments for shipment to other States. Investigations made through the cooperation of officials and dealers in these States apparently fail to substantiate these rumors. No matter where a thermometer goes, if it bears a Mass Seal, it is the responsibility of the manufacturer to see that it conforms to his original samples as approved by the director, and he is bonded to fulfill his agreement. When the agreement is violated, the authority of the manufacturer is revoked. This action has been taken in seven instances, and other producers have been under suspension for varying periods.

Besides the director and his inspectors, the sealers of weights and measures (one or more of whom is located in every city and town) cooperate with the director in making inspections in drug stores, etc., and reporting in detail the thermometers on hand, thus aiding materially in the enforcement of the law.

Through the efforts of Representative (now Senator) Frothingham, a prominent physician of Lynn, Massachusetts was the first State in the Union to adopt legislation affecting clinical thermometers, although the Governments of England, France, and Japan, and the United States Bureau of Standards have been testing clinical thermometers for some time. At the present time New York City and the State of Connecticut have legal regulations on the subject, and several other States contemplate the enactment of legislation.

Many chain drug stores, mail-order houses, hospitals, jobbers, and dealers in States where no protective legislation has been enacted purchase only thermometers bearing a Mass Seal, and rarely does a day pass without a communication from persons outside the State requesting information relative to the Massachusetts law.

Because of the acknowledged accuracy and value of a Mass Seal thermometer, one unauthorized manufacturer placed a spurious seal mark on his thermometers and sold them in Massachusetts. With few exceptions the entire lot was found by our inspectors and taken to the statehouse, where they were condemned and confiscated, the manufacturer was fined $100, and I believe has since discontinued business. Practically all of these thermometers were grossly inaccurate, and I quote the words of a Winchester druggist, who brought one home for his own use: "No wonder I was running a fever although I felt O. K."

Various subterfuges and enticing appeals have been employed in attempting to secure the authority to use the MASS SEAL. Manufacturers have sent thermometers to the United States Bureau of Standards at Washington for test before submitting them to the director in Massachusetts, expecting the former would weed out the bad ones, and a perfect percentage be received when tested by the latter. Others have sent them to competitors for test before sending them to the director; others have appealed in many and varied ways, but always the answer is the same: "Comply with the rules and regulations, specifications and tolerances, and you will secure and retain the authority to use the Massachusetts seal."

Since the work of testing began in 1919 to December 1, 1925, 54,631 thermometers have been tested. Of these, 40,464, or 74.06 per cent, have been certified and 14,167, or 25.93 per cent, have been condemned. During the past three years the instruments have been itemized, as follows:

	Tested	Passed	Rejected	Passed
				Per cent
Massachusetts sealed thermometers	7,240	6,229	1,011	86.03
Domestic unsealed thermometers	12,783	10,602	2,181	82.93
Foreign unsealed thermometers	3,481	1,713	1,768	49.20

The percentage of sealed thermometers passing test was materially reduced by the number of thermometers rejected in lots taken from jobbers in the regular inspection, as a result of which the authority granted several manufacturers was revoked. The unsealed thermometers tested were, with few exceptions, submitted by manufacturers endeavoring to secure sealing privileges. The percentage of foreign thermometers passing test speaks for itself.

Interested parties desiring further information regarding the Massachusetts law, method of test, etc., should communicate with the Director of Standards, room 194, Statehouse, Boston, Mass.

INSERTION OF OFFICIAL GROUP PHOTOGRAPH IN RECORD

Mr. CUMMINGS. Mr. Chairman, I notice that an official group photograph will be taken, and it has occurred to me it would be a good thing if we could this year incorporate a copy of that photograph in the proceedings of the conference and continue this practice in subsequent years.

Mr. HOLBROOK. We will take the suggestion under advisement, and if consent can be obtained we will be glad to publish it.

Doctor BURGESS. We will do the best we can. If the conference would like to see it we will try to put it in. Do you think it would serve a useful purpose?

(The delegates unanimously expressed such an opinion.)

The ACTING CHAIRMAN. If there is no further business we will take a recess until 2 o'clock.

(At this point, at 1 o'clock p. m., the conference took a recess until 2 o'clock p. m.)

FOURTH SESSION (AFTERNOON OF WEDNESDAY, MAY 26, 1926)

The conference reassembled at 2.35 o'clock p. m., at the Bureau of Standards, Dr. George K. Burgess, president, in the chair.

THE MEASUREMENT OF PETROLEUM PRODUCTS

By Charles M. Fuller, *Sealer of Weights and Measures, City and County of Los Angeles, Calif.*

Mr. Chairman, ladies and gentlemen of the conference, some years ago when our department of weights and measures first undertook the inspection of large meters used in the measurement and sale of petroleum products, we found ourselves confronted by a number of problems. In the first place it was apparent that the 5-gallon test bucket used for pump-inspection work would be entirely inadequate for testing a meter whose minimum rate of flow might be 20 gallons per minute. With that in mind we designed a test buggy of 50 gallons capacity, similar in type to the 5-gallon buckets, the capacity reading coming at the center of a high pipe-neck equipped with gauge glass and calibrated gauge. (See fig. 6.) This buggy is mounted on rubber-tired wheels for moving it about at the place of inspection, and is carried from place to place on a trailer. (See fig. 7.) It is also equipped with a rotary hand pump by means of which it can be quickly emptied.

For the benefit of those who have only a few meters to test and whose budget does not allow the expense of building this equipment, a very satisfactory outfit can be made from a common steel drum of approximately 50 gallons capacity. Cut two blocks of wood to hold the drum from rolling when it is placed with the side opening directly overhead. Securely fasten a 4-inch pipe, a foot or more in height, to this opening, making sure that it does not project into the drum and form an air pocket. A gauge glass and gauge can be connected at small expense. Use a standard measure and fill the drum with water until the center portion of the pipe is reached, mark the capacity to this point, and you have a very good emergency outfit. A small displacement cylinder can be placed in the drum to bring the capacity reading to even gallons.

At the time of our first inspection many inaccuracies were found, in some cases as high as 5 per cent, due in part to poor installations, to the fact that meters for the measurement of petroleum products were in more or less of an experimental stage and had not reached the accuracy and efficiency which we find to-day, to the use of large meters for small rates of delivery which would allow some of the liquid to by-pass without registering, and to small meters which were being crowded beyond the safety point in an effort to make them do work for which they were never intended. Adequate strainers were not provided and particles of dirt and grit were constantly gum-

ming up the meters. The lines did not have air risers for the elimination of air from the liquid, and the pressure caused them to hammer and pulsate. In some cases the meter indicator was noted to jump a gallon when the valve was suddenly closed with consequent hammering and pounding at the meter.

To F. J. Berka, senior pump inspector in our department, was assigned the task of ironing out these troubles and carrying out experimental work with trial installations until one should be found that was satisfactory. The meter companies and oil companies gave us their hearty cooperation and every possible assistance, so that we were provided with various types of meters, pipe lines, storage tanks, and other necessary equipment. We owe these men and their companies a debt of gratitude for their interest and help which have enabled us to make so much progress in the advancement of weights and measures.

The work was carried on at the company stations on the docks at Los Angeles Harbor. Without going into details, several months time was consumed, entire installations were torn out and built over, and numerous hook ups were tried before it was demonstrated that a thoroughly satisfactory type of installation had been developed.

This installation was then given a 10 months trial at several locations with several different makes of meters. The result was most gratifying, the meters operating within tolerance after this length of continuous service. In only one case was any trouble encountered. This was where the same line used for delivery had been utilized to pump back into the storage tanks a quantity of liquid from a barge, which allowed an excess accumulation of dirt and water to enter the line, some of it penetrating to the meter. When this was cleaned out the meter tested within tolerance. This experience emphasizes the importance of maintaining delivery lines for delivery purposes only.

Briefly described, the installation is as follows: The meter is placed above the level of the dock or platform, so that it is readily accessible in case any adjustments or repairs are needed. It may be inclosed in a hinged box for protection. The piping is so arranged that the meter is in a pocket, keeping it full of liquid at all times. Just ahead of the meter is placed a strainer for eliminating all particles of foreign matter. In front of the strainer, at the point where the piping from under the dock rises and describes a right-angle turn, an air riser is connected. The upper part of this riser is larger in diameter than the opening, providing a cushioning effect.

For the testing of large meters whose capacity may be as much as 240 gallons per minute the 50-gallon buggy is inadequate, and a vehicle tank wagon that has been carefully gauged by the department is utilized.

The apparatus used for the gauging of vehicle tanks consists of a tank approximately 34 inches in diameter and 12 feet in height. (See fig. 8.) It is rigidly mounted on a substantial platform, so that the bottom of the tank is above the top of the dome of the largest tank wagon, providing a gravity flow. Overlapping gauge glasses with calibrations from 0 to 425 gallons are placed on the side. An overflow pipe insures filling to the same definite level. An emergency overflow is also provided, so that if any leakage should occur from

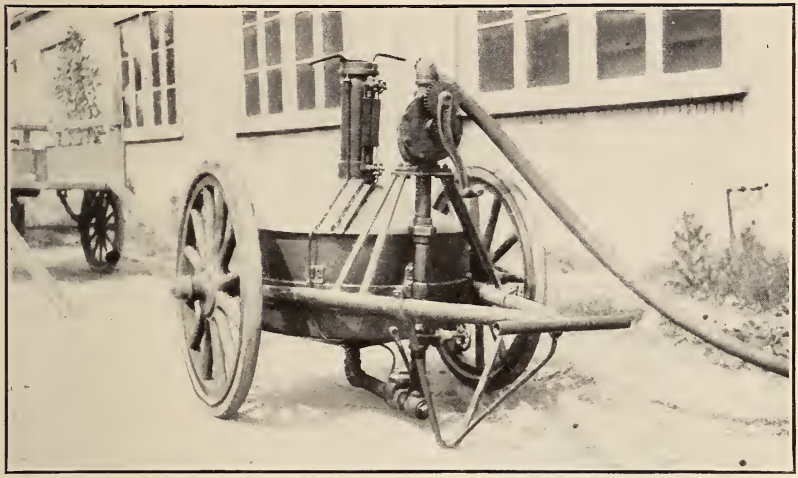

FIG. 6.—*Special 50-gallon measure used in test of large-capacity gasoline meters*

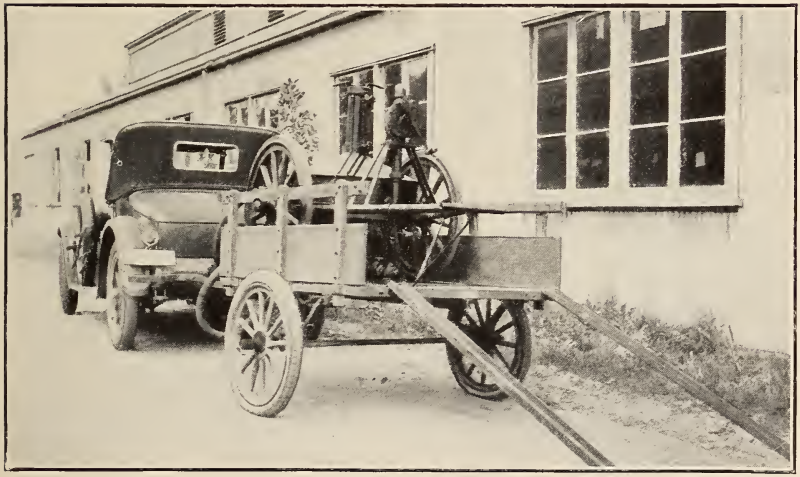

FIG. 7.—*Trailer for transporting special 50-gallon measure*

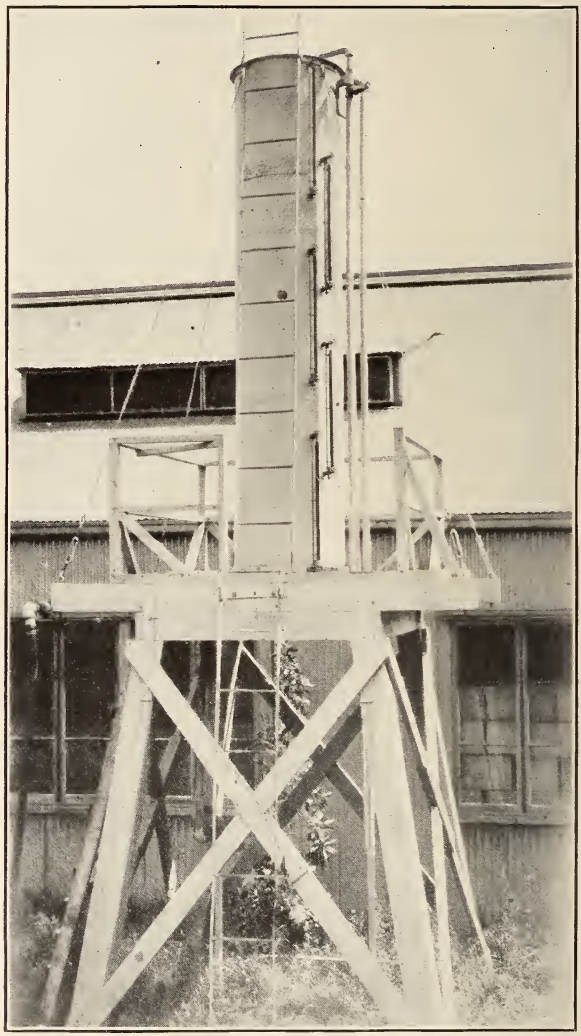

FIG. 8.—*Apparatus for gauging vehicle tanks*

the intake valve it will not dribble into the tank. At the present time we are adding another twin tank so as to speed up the work, one tank filling while the other is being emptied. Water is used as a testing medium. This outfit recommends itself by its simplicity and accuracy.

In conclusion, let me emphasize the fact that in order to give satisfactory results a meter must be installed so that all foreign matter and air are eliminated, and it must be operated within the limits of speed and pressure for which it is designed.

(At this point, by means of lantern slides, Mr. Fuller illustrated a number of meter installations and also the special testing equipment described in his paper.)

THE OPERATION OF COMPULSORY SALES-BY-WEIGHT STATUTES

REMARKS OF FRED BENJAMIN, SUPERINTENDENT OF STANDARDS, STATE OF ILLINOIS

The Illinois act in relation to weights and measures, effective July 1, 1921, has proven satisfactory to weights and measures officials as well as to the general public, and thus far has been construed to cover every question which has arisen with reference to its enforcement without controversy or suits at law. This law was based upon the model law as recommended by the Annual Conference on Weights and Measures of the United States at the Bureau of Standards, as revised and improved upon by William F. Cluett, chief deputy inspector of weights and measures of the city of Chicago, Ill.

It is to be noted that in the preparation of this bill Mr. Cluett modified some sections of the model law and added others; for example, the requirements for city sealers in cities, towns, and villages having a population of less than 25,000 inhabitants according to the last official Federal census, and county sealers in all counties were eliminated. The director of the department of trade and commerce, through the division of standards, is charged with the enforcement of this law.

The section of the law relating specifically to net weight recites that—

> Whenever any commodity is sold on a basis of weight, it shall be unlawful to employ any other weight in such sale than the net weight of the commodity; and all contracts concerning goods sold on a basis of weight shall be understood and construed accordingly. Whenever the weight of a commodity is mentioned in this act, it shall be understood and construed to mean the net weight of the commodity.

Another section reads:

> Sec. 32. Contracts hereafter to be executed, made within this State, for any work to be done, or for anything to be sold, delivered, done, or agreed for, by weight or measure, shall be taken and construed to be made according to the standard weight and measure ascertained as hereinbefore provided unless there is an express provision to the contrary.

While another section provides that—

> Whenever any of the following articles shall be contracted for, or sold, or delivered, and when no special contract or agreement shall be made to the contrary, the weight per bushel or barrel or divisible merchantable quantities of a bushel or barrel shall be as follows.

The statutory weight per bushel is then given for about 75 different commodities.

Shortly after my appointment as superintendent of the division of standards, I arranged for a conference with Mr. Cluett and we concluded that a campaign of education was necessary as the first step to be taken toward the enforcement of this law, and he kindly consented to prepare such instructions to merchants and dealers as would seem appropriate, justifiable, and enforceable. These instructions were printed in pamphlet form and distributed by our inspectors, together with copies of the law published in pamphlet form, to manufacturers, bakers, packers, wholesalers, jobbers, merchants, and dealers doing business in the State, and our inspectors are still distributing these pamphlets, which read in part as follows:

INSTRUCTIONS TO MERCHANTS

Merchants are advised that the new law governing weights and measures in the State of Illinois, approved June 30, 1921, requires that all scales shall be kept in balance, and also requires that all sales made on a basis of weight, within the State, shall be made on the basis of net weight.

Net weight means the weight of article being sold not including the weight of the dish, carton, package, container, or paper the article is put or wrapped in for convenience in handling or delivering. A pound of butter means 16 ounces of butter, a pound of coffee or sugar means 16 ounces of coffee or sugar, etc.

Dry commodities formerly sold by dry measures shall not be sold in any other manner than by standard avoirdupois net weight or by numerical count, unless otherwise agreed in writing by the mutual consent of the buyer and seller.

This section simply means that the dry measure formerly used as a standard of measurement for the sale of potatoes, apples, fruits, vegetables, and other dry commodities where the sales were made from bulk is no longer permissible or legal. Unless there is a written contract to the contrary, signed by the parties thereto, hereafter these fruits, vegetables, and other dry commodities shall be sold by standard avoirdupois net weight or by numerical count.

Where fruits or vegetables are sold for which no statutory weight is given the sales shall be made by weight on a basis of your price per pound, or by numerical count. Merchants are not authorized to arbitrarily make standards of their own.

Cabbage, celery, beets, carrots, and vegetable roots, which by common custom have been sold by the head or bunch, may still be sold in this manner or by weight or count.

Berries or small fruits shall be sold in no other manner than by weight, or in boxes, baskets, or other open containers holding 1 quart or less, of the following capacities, when level full: 1 quart, 1 pint, or ½ pint, standard dry measure.

Merchants will not be excused from the charge of violating this section by claiming that they sell berries at so much per box without any representation of weight or measure, if the boxes are found to be of different capacities than those prescribed.

Do not use liquid-capacity measures for measuring anything to be sold except liquids. All liquid measures must be plainly marked with the capacity thereof.

Do not use dry-capacity measures at all. Sell fruits, vegetables, and other dry commodities by standard avoirdupois net weight or by numerical count.

Have a sign painted and hung up in your store giving the legal weight per bushel of the different fruits and vegetables in Illinois.

If you sell fruits or vegetables for which no legal weight is prescribed, sell them by the pound.

Do not make up and sell smaller baskets of fruits or vegetables out of other original packages, to be sold at so much per basket. Only original baskets or packages as put up by the grower, producer, or shipper may be

sold in this manner. Your basket is merely a container, the contents of which must be sold either by standard avoirdupois net weight or by numerical count.

Do not sell except by true net weight or measure, over sealed scales and measures.

Do not handle package goods unless the package is marked to indicate clearly the net contents in terms of weight, measure, or numerical count.

We attribute our success in the enforcement of our sales-by-weight law largely to the distribution of our rules and regulations, copies of the law, and other literature as a matter of education relative to its requirements.

Complaints on account of short weight of packages, boxes, cartons, or wrapped packages sold or offered for sale by retail dealers—not being true to the weight marked thereon—are reported to the office and are taken up with the manufacturer, wholesaler, or packer for adjustment and correction, and adjustments have been made without controversy.

The use of dry measures by merchants and dealers in the sale of various commodities has been practically eliminated.

Violations of the law with reference to selling by net weight have been taken up with the State's attorney of the county where such violations occur, or with the city or village attorneys, for correction, and thus far we have found these various officials friendly to the enforcement of the weights-and-measures law.

REMARKS OF I. L. MILLER, COMMISSIONER OF WEIGHTS AND MEASURES, STATE OF INDIANA

The Secretary of the United States Treasury, at the direction of Congress, delivered to each State a complete set of standard weights and measures in 1836. Prior to this date, however, most of the States had adopted standards independently of the Government, and, unfortunately, of each other. Standards of the same denomination often varied widely and much confusion resulted from which we have not yet recovered.

In the absence of adequate legislation by Congress, the individual States have endeavored to facilitate commercial transactions and insure full justice to the consumer by the adoption of more uniform and scientific methods of measuring commodities. Volumetric measures were commonly used for dry commodities by the Colonies and by the States in the early period of our Government. They were cheap, convenient, and answered very well the demands of the less complex transactions of commerce of those days. Scales were expensive and not of the convenient types found in present use. Volumetric measurements of dry commodities were not satisfactory, as is evidenced by the adoption by nearly all the States, of bushel weights for three or more commodities. Bushel weights have been adopted in the various States for about 175 commodities, including fruits, vegetables, seeds, and nuts; also some materials, such as lime, salt, etc.

The bushel was first defined in England in the "Statutes of the assize of bread and ale" in these words: "Eight pounds do make a gallon of wine and eight gallons of wine do make a bushel." Some attempt was thus made at conformity between volume and weight.

State legislatures in enacting bushel-weight laws have attempted more or less successfully to maintain the relation between volume and weight. As pointed out in a previous paper before this conference, a study of these bushel-weight laws indicates that the commodity weight selected in most cases may have been dependent upon one or more of the following considerations: First, the weight of the quantity of the commodity itself; second, the weight of the quantity of the commodity that will in its natural state fill a bushel measure; third, the weight of the quantity which will be contained in the bushel measure when heaped, in some instances to rounding, in others to the maximum; and fourth, a weight determined by certain local commercial practices and which may have no close relation to volume.

It was also pointed out in the same paper that the abolition of bushel weights might be reasonably urged because, first, the system as it exists is unscientific, complexity rather than simplicity resulting; second, the system is cumbersome, unwieldy, and difficult to enforce; third, the bushel weight is either unnecessary or will be unnecessary in a comparatively short time, because producers and dealers have found it expedient to buy and sell dry commodities by weight rather than by measure; and fourth, bushel weights have not accomplished the purposes intended, namely, the protection of the ultimate consumer and the standardization of trade practices. Bushel-weight laws have served a good purpose in furthering the sale of dry commodities by weight and should not be repealed unless something better is offered. Clearly the alternative is the sale of dry commodities upon the hundredweight basis.

A few of the States have endeavored to replace the bushel-weight laws by sales-by-weight laws and to extend such laws to include all dry commodities that lend themselves to this method of measuring. Such has been the case in Indiana. The sale of dry commodities by weight has been a slow evolutionary movement, beginning almost with the first legislation on the subject of weights and measures. The inspection of weights and measures and the regulation of the sale of commodities had their origin in the State under a legislative act of 1852, which required the county commissioners of each county to procure and keep in a suitable location a set of standard weights and measures. Upon request any citizen of the county could have his weights and measures "tried" by the county standards by applying to the county auditor, who was authorized to seal the devices if found correct. Needless to say, but few tests were made under this statute. In 1885 the legislature enacted a law fixing the bushel weights for 32 commodities, a gallon weight for sorghum molasses, and barrel weights for beef, pork, and flour.

The first general weights and measures act establishing a State department of weights and measures was passed in 1911. This act contained the usual provisions for adopting standards, the appointment of county and city inspectors, the testing and sealing of scales, weights, and measures, and the conferring of police powers upon all weights and measures inspectors. This act was amended two years later to require all commodities to be sold by standard weight or measure except those customarily sold by numerical count or in gross, or those sold in packages so marked as to indicate net contents.

Under this amendment the commissioner secured the labeling of most package commodities with the net content. The amendment was interpreted to require either the weighing or measuring of the article in the presence of the customer or a statement on the package of the net content.

In 1917 a sale-by-weight law and a new bushel-weight law were enacted. The first of these acts named specifically 91 articles or classes of articles, including grains, seeds, and foods, and contained a further general provision bringing within the purview of the law practically all dry commodities. This act exempted seeds in sealed packages, articles in the sale of which the buyer and seller had entered into a written agreement, and foodstuffs delivered from house to house directly from the source of production by the original producer. The second act was in reality a reenactment of the bushel-weight law passed 65 years previously, with the addition of 20 commodities. The sale-by-weight law was later held unconstitutional by a county court because of the exemption of the original producer from its requirements. This the court held was "class legislation." Because of circumstances over which the State commissioner of weights and measures had no control, and because of certain enforcement difficulties, this case was not carried to the State supreme court.

Both the sales-by-weight law and the bushel-weight law were difficult to enforce; the bushel-weight law, because of reasons already pointed out in previous papers and discussions before this conference, and both laws because of conditions arising from interstate commerce. At the time these laws were enacted there existed a great lack of uniformity in size and dimensions of vegetable and fruit containers used in interstate commerce. The consignee was usually billed with a certain number of baskets, barrels, or crates. It was difficult to secure the resale of these commodities by weight in accordance with the State sale-by-weight laws.

Recent Federal and State legislation fixing sizes and specifications for fruit and vegetable containers has removed some of the difficulty. In 1923 the legislature enacted the uniform fruit and vegetable containers act fixing standards for round stave baskets, hampers, splint baskets, climax baskets, and berry baskets. All containers of these types now manufactured within the State comply with the sizes and specifications contained in the law. With few exceptions fruits and vegetables coming into the State are packed in containers also of legal sizes and dimensions.

Because of changed conditions, and to remove some of the obstacles in the way of enforcement of existing sale-by-weight laws, it was thought advisable during the legislative session last year to introduce a bill for a new general weights and measures law. The law as passed contains two sections bearing on the subject of this paper. Section 10 reads in part as follows:

> All commodities shall be sold by standard weight or measure except as otherwise provided in this act: *Provided, however,* That the provisions of this section shall not apply to commodities which are usually and customarily sold by numerical count, or in gross, or are sold in packages prepared and put up for sale: *Provided,* That all commodities packed in such packages shall be so marked as to plainly indicate the net contents in terms of weight, measure, or numerical count.

Section 12 reads in part as follows:

All commodities shall be offered for sale or sold upon the basis of avoirdupois net weight or by numerical count only, and it shall be unlawful for anyone to use or employ any dry capacity measure, basket, barrel, or container of any kind as a means of determining the amounts or quantities of any commodities offered for sale or sold: *Provided, however,* That the provisions of this act shall not be construed to apply to fruits and vegetables sold in the original standard container.

We were trying to find some legal way by which commodities coming into the State could be sold without requiring a straight-out sale by weight.

Some further provisos are made in this section regarding the sale of vegetables by the bunch and fresh berries or small fruits in bulk. The term "commodity" is defined by the law to mean commodities or articles other than liquids which are capable of being measured by dry capacity measure. The term "original standard container" is defined to mean and include only barrels, boxes, baskets, hampers, or similar containers, the dimensions or capacity of which is established by law of the State or by act of Congress, the contents of which have not been removed or repacked, and upon which is plainly and conspicuously marked the net quantity of contents in terms of weight, measure, or numerical count. This section of the law is practically the same as the New Jersey law.

Two difficult problems have arisen in the enforcement of the sections above quoted. The first is in connection with the sale of certain commodities whose weight may change through loss of moisture or some volatile constituent after the sales package is prepared. Perhaps the most notable example of this class of commodities is toilet and laundry soaps. But few, if any, of these soaps are labeled with the net weight. They vary greatly in shape and cubical content. The consumer has no adequate means of determining the comparative values of these articles on the basis of quantity. The manufacturers urge as the chief reason for not labeling with the net weight the change of weight through the loss of moisture after packing. It has also been claimed that soaps are generally sold by numerical count and are therefore not subject to net-content labeling requirement. This argument could as well be applied to any commodity in package form. In the related line of soap powders and soap chips some packages are labeled, others are not. The old idea that change in size of the sales package is necessary in order to maintain a uniform retail price has disappeared, except in the case of a very few classes of articles. Odd-penny prices are as common as the even-change prices. For the most part, dry commodities other than a few classes such as noted above are labeled as to net weight when in package form and are weighed when taken from bulk stocks.

The second problem is in connection with the sale of fruits and vegetables in "original packages." The term "original package" is not properly defined in the law. While the authors of the bill intended this term to include only products packed by the producer, the term is capable of a different interpretation. The dealer who purchases apples in carload lots and fills them into standard baskets insists that he has complied with the terms of the law. These filled baskets are "original packages" and may be sold to the consumer

or retailer as such. In view of this interpretation it is clearly evident that any person can buy any dry commodity in bulk, place it in standard containers, and sell it by volume.

In view of the fact that the law authorizes the State commissioner to adopt necessary rules, specifications, and tolerances for its enforcement, the following questions were recently addressed to the attorney general of the State:

Section 12 (of the weights and measures law of 1925) provides for the sale of commodities by net weight or numerical count only, but exempts fruits and vegetables when sold in the original standard container. The "original standard container" is defined later in the same section. Under the authority conferred upon the commissioner of weights and measures in section 2 to adopt rules, specifications, and tolerances necessary for the enforcement of the provisions of the act, can he more specifically define the "original standard container"? Can he limit the sale of such packages of standard barrels, boxes, baskets, and hampers to those packed by the producer of the vegetables or fruits?

To these questions the attorney general replied:

I call your notice to the provisions of section 12 of the weights and measures act, which defines the term "original standard containers" to mean and include only barrels, boxes, baskets, hampers, or similar containers, the dimensions or capacity of which is established by law of this State or by act of Congress, the contents of which have not been removed or repacked, and upon which is plainly and conspicuously marked the net quantity of contents thereof in terms of weight, measure, or numerical count.

While section 2 of the act authorizes you to adopt rules, specifications, and tolerances necessary for the enforcement of the weights and measures act, it is my opinion you are not empowered to more specifically define the original standard container, but are limited to the definition of the term in the act itself. In my opinion you can not lawfully limit the sale of such packages or standard barrels, boxes, baskets, and hampers to those packed by the producer of the vegetables or fruits contained in them.

A minor consideration in connection with the question of what constitutes an original package is the use of a lid. No decision has yet been reached on this point. Neither have rules been issued for the repacking of fruits or vegetables that may have become partially decayed.

A lack of satisfactory solutions for these problems has more or less hindered the operation of the law. The problem of the "original package" is minimized because the bulk of vegetables and fruits are sold to the consumer in small quantities over the retailer's counter. Such sales are universally made by weight throughout the State. The dry measure has long been eliminated as a retail method of selling fruits and vegetables. Occasionally violations occur through the use of standard baskets as measures, but such violations are usually committed by peddlers, who are sooner or later brought to account. The bushel weight for fruits and vegetables in Indiana has been practically eliminated by the new law. Bushel weights for farm grains and seeds were retained upon request of farmers and grain dealers. While many of the mill and grain dealers were in favor of eliminating bushel weights for farm grains and seeds, this was thought impracticable at this time because of board of trade operations, which are carried on in terms of "bushels." Brokers objected that the sale of grains and seeds on the hundredweight basis would cause them financial loss, because it was argued

that the commission on a hundredweight would be no larger than on the bushel weight. As a matter of fact, all farm seeds and grains are sold on the basis of avoirdupois weight. In many transactions between farmers and dealers in these commodities, pound or hundredweight is the unit of measure and not the bushel.

Adequate Federal legislation would greatly aid State enforcement of sale-by-weight and net-content-marking laws. Except in the case of foods and drugs, interstate shipments of short weight or measure or unmarked merchandise can not be prevented, nor has the receiver of such merchandise any recourse. A Federal law similar to the standard container act of 1916 for climax baskets and berry boxes, covering round stave baskets, hampers, and crates, and containing strict net-content-labeling provisions would, when enforced in cooperation with the States, remedy most short weight and measure evils existing in interstate commerce and would greatly strengthen State regulation.

DISCUSSION OF ABOVE PAPERS

Mr. Schwartz. Mr. Chairman, in New Jersey we struggled along for many years without the sale-by-weight law, which now has been in operation in our State for nearly two years. It became effective on July 1, 1924. Prior to that time we had the weight per bushel of the commodity, whether fruit, vegetable, or grain; they could be sold by the weight or by dry measure. That went on for a number of years.

In 1916 we adopted the net container act; it was framed after the Federal food and drugs act. We used that with the amendments thereto in 1915, and in addition we standardized the size of the baskets, eliminating all of what we had termed "undersized baskets," making them conform to the standard dry measure in capacity. Then we found that there was considerable difficulty in the operation of this dual system of a sale either by dry-capacity measure or by the weight per bushel. The act provided that if the commodity was sold by dry measure the weight per bushel must govern, too. We found in our investigations that there were very many discrepancies as to the weight of the bushel at various times. We might get 60 pounds of Irish potatoes in a bushel basket; very many times it was impossible so to do. Along in 1924, as I have mentioned, we had our law passed, after having had considerable experience with this dual system.

We had concluded that the solution of the problem was the passing of the act which made the sale by weight mandatory. We found in connection with the enforcement of the act that the greatest problem confronting us was the education of the purchasers to order their commodities in terms of weight instead of measure. While this is rather trying, we are making progress. It is a difficult matter at any time to divert the public from long-established customs, not that they lack appreciation of progressive movements designed for their benefit, but that they are merely lackadaisical and do not make any great amount of effort to familiarize themselves with new issues.

We consider our sale-by-weight law perfect except in one important particular, and I mention this that other States that may have the project in mind may benefit by our experience. In practically all laws certain exemptions are more or less necessary. In order to make any headway in the legislature with our bill when it was up for passage, we were forced to include an exemption to cover commodities shipped in original standard containers. The purpose of the exemption so far as our department was concerned was that this exemption should include only covered packages, but unfortunately the word "covered" was omitted in the drafting of this legislation, which has resulted in producers placing a very liberal construction upon the law. They have contended that in its present form it applies to all containers whether covered or uncovered. It is not difficult to see how this would tend to defeat the purpose of the law in some respects, particularly where these producers attempt to use containers of the smaller capacities, such as 2 and 4 quarts, and sell by dry measure instead of weight. This, to my mind, is a point to be guarded against in the drafting of such legislation. I might say that we made an attempt at the past session of our legislature to correct the discrepancy, but without success.

Mr. Ragland. In Virginia we have a law which specifies that the weight shall be correct at the time of delivery. A question has arisen that I would like to have answered. Our dairymen, who have recently been using considerable Canadian hay, find that it is running short. What can be done in that case?

Mr. Bulson. I come from Jefferson County, in the northern part of New York State, and I have had to do with several shipments of hay coming from Canada. I have the buyers of my section educated so that they immediately have hay weighed so that it can be checked if short; and our hay dealers are very glad of the help of the department of weights and measures, as it keeps them from paying for more than the weight they receive. There is a considerable shrinkage in this commodity.

Mr. Dalziel. Mr. President, I would like to say that up in our State we permit a tolerance not to exceed 2 pounds per bale. If the tag weight is within 2 pounds per bale we let it pass, otherwise it is short.

Mr. Tinkey. We have had very good results with our container act in Ohio, but we are going to try to amend it in one respect. The law now allows all multiples of the dry quart; 9, 10, 11, 12, 13, and 14 quart baskets, for instance. We would like to allow only 2-quart multiples, as 2, 4, 6, 8 quart, etc.

Mr. Foster. Mr. Chairman, I would like to ask the gentlemen from New Jersey and Indiana whether the wholesaler is included in their sale-by-weight laws. Our law in Massachusetts is limited to the retail sale of all commodities.

Mr. Schwartz. Mr. Chairman, in reply I would say that the language of our act is very general; any person or corporation, either wholesaler or retailer, is within the purview of the statute.

Mr. Foster. We have a net-weight law and I have always maintained that it should cover both retail and wholesale transactions, but our law says retail only.

CITATION BY WEIGHTS AND MEASURES OFFICIALS OF IMPORTANT COURT DECISIONS IN THEIR JURISDICTIONS [12]

(At this point each State represented was called upon to report to the conference the citation to and a brief description of each important weights and measures case decided in a court of record in that State, the request for the preparation of this material having been made previously by correspondence. Delegates who were not prepared with this information were invited to submit it by mail for inclusion in the record.

The majority of the delegates reporting stated that in their jurisdictions there had been no cases decided in courts of record. There is given below a digest of those cases which were reported.)

ILLINOIS

City of Chicago *v.* Wisconsin Lime and Cement Co., 312 Ill. 520.

Upon appeal from the decision in a test case under the public weighmaster ordinance of Chicago it was held that the power to regulate necessarily includes the power to make the regulation effective and to provide for methods of weighing which will secure truthful results. The commodity sold and paid for by weight is necessarily weighed, and the authority (under the ordinance) is not merely to create a mental state in the seller or rule or regulation that he shall give honest weight, but it includes supervision, oversight, control, and prescribing methods to secure the intended result.

Fred A. Kautz *v.* City of Chicago, 313 Ill. 196.

The Chicago coal ordinance was held invalid in so far as it gave to the weights and measures officials the right to stop and reweigh loads of coal in transit which had originally been weighed on approved scales by bonded, licensed weighmasters. Such a regulation was held to authorize interference with the orderly conduct of a lawful business where there is no reasonable ground to believe that the law is being violated.

For a more detailed discussion of these cases, reference may be made to the paper on "The supervision of weighmasters," by William F. Cluett, appearing on pages 12 to 21, inclusive, of the report of the Eighteenth National Conference on Weights and Measures.

MASSACHUSETTS

Joel Hewes *v.* Isaac B. Platts, 12 Gray 143.

In an action for goods sold by weight or measure, the burden of proving that the weights or measures were not sealed in the town of the plaintiff's residence, as required by Stat. 1847, c. 242, is upon the defendant; and proof that they were not duly sealed in the town of the sale, without also proving that the plaintiff was an inhabitant of that town, will not defeat the action.

Augustus J. Sawyer, administrator, *v.* Benjamin Smith, 109 Mass. 220.

No action lies to recover the price of hay sold by the ton, when weighed on scales, not provided by the buyer, which have not been sealed as required by the Gen. Stats., c. 51, s. 16.

---

[12] The Bureau of Standards contemplates issuing in the near future a circular devoted to leading weights and measures cases. It is planned to include in this circular citations to the more important weights and measures cases of the various States which have been decided in courts of record up to the time of publication of the circular. For later cases reference may then be made to the reports of the National Conference on Weights and Measures, which will contain information on this subject from year to year.

Orlando M. Palmer and another *v.* Michael Kelleher, 111 Mass. 320.

A provision dealer had his shop in N, but most of his customers lived in W, and he weighed and measured the provisions from his market wagon as he delivered them to his customers. His weights and measures were sealed in W, but not in N. *Held*, that they were not sealed in the town where he had his "usual place of business" within the Stat. of 1870, c. 218, s. 1, and that he could not recover for goods sold by them.

Margaret Ritchie *v.* David J. Boynton, 114 Mass. 431.

A recovery can be had for the price of milk sold in milk cans not sealed as required by Stat. 1870, c. 218, if the sealer of weights and measures has not been refused permission to test the cans, and if they have not been by him condemned.

John F. Eaton *v.* Patrick Kegan, 114 Mass. 433.

A recovery can be had for the price of articles sold by weights or measures not sealed as required by Stat. 1870, c. 218, if the sealer of weights and measures has not been refused permission to test them, and if they have not been by him condemned.

By the Gen. Stats., c. 49, s. 63, sales of oats and meal must be by the bushel, and an action can not be maintained for their price if sold by the bag.

Commonwealth *v.* Andrew McArthur, 152 Mass. 522.

At the trial of a complaint for the sale of bread in violation of the Pub. Stats., c. 60, s. 3, 4, it appeared that the bread sold was a loaf weighing 13 ounces, not composed chiefly of rye or maize. The presiding judge excluded evidence offered by the defendant to show that the loaf contained milk, butter, and sugar, and was made for and was fancy bread; and declined to rule, as requested by him, that if it contained substantial parts of these three ingredients, then it was not bread, the sale of which was regulated by the statute. *Held*, that the defendant had no ground of exception.

Moneyweight Scale Co. *v.* Felix C. McBride, 199 Mass. 503.

A suit in equity can not be maintained to enjoin a public officer from deciding a question committed by statute to his decision on the ground that he threatens to come to a wrong conclusion. If in deciding the question he should proceed on erroneous principles of law, his decision could be quashed on certiorari, or in some cases a writ of mandamus might issue directing him to take specific action, but this court has no jurisdiction to take from him the duty of deciding the question.

A bill in equity will lie to enjoin a public officer from taking action injurious to the plaintiff's rights of property under a statute which is unconstitutional.

It would be a proper exercise of the police power for the legislature to forbid the sale of incorrect tables of value to be used by dealers as correct tables of value in making sales of articles by pounds and ounces, and equally so to prohibit the sale of such a table when it is made a part of an automatic self-computing scale.

The act of a sealer of weights and measures in determining the correctness of a table of weights and values which is required to be arithmetically correct is ministerial in character.

A statute, which should require the sealers of weights and measures to pass upon the commercial correctness of self-computing scales or other devices and to determine finally the question how great a departure from mathematical accuracy is permissable in fixing the values of small articles sold by weight without making the transactions commercially and therefore legally incorrect, and also to determine the question whether a table of values, which are only commercially correct because they disregard fractions of a cent, is a proper basis for finding the true weight of articles sold by the cent's worth, would be unconstitutional, these being judicial questions which can not be left to the final determination of an executive officer.

Stat. 1907, c. 535, providing that all scales, balances, computing scales, and other devices having a device for indicating or registering the price as well as

the weight of the commodity offered for sale shall be tested by the sealers of weights and measures as to the correctness of both weights and values indicated by them, requires that the values thus indicated shall be correct arithmetically and shall not disregard fractions of a cent.

Under Stat. 1907, c. 535, providing that all scales, balances, computing scales and other devices having a device for indicating or registering the price as well as the weight of the commodity offered for sale, shall be tested by the sealers of weights and measures as to the correctness of both weights and values indicated by them, the correctness to be passed upon is purely arithmetical and the statute for that reason is constitutional.

Commonwealth *v.* Isaac Sacks, 214 Mass. 72.

Under Stat. 1907, c. 394, s. 1, which provides for the punishment of one who "himself or by his servant or agent" gives false weight or measure, a defendant can be convicted upon evidence of short weight in a sale made by a servant of the defendant in the defendant's absence.

Commonwealth *v.* Hyman Gussman, 215 Mass. 349.

Stat. 1902, c. 115, providing that a barrel of sweet potatoes shall contain 150 pounds, is not a regulation of interstate commerce, and is constitutional.

Stat. 1907, c. 394, as amended by Stat. 1911, c. 163, providing that whoever gives or attempts to give false or insufficient measure shall be punished as there stated, is constitutional, and is not unconstitutional as applied to a sale by insufficient measure of a barrel of sweet potatoes in the original package in which they were brought from another State.

Commonwealth *v.* George E. Hunt, 216 Mass. 126.

Under R. L. c. 57, s. 83–90, and acts in amendment thereof, in regard to the sale of coal, and the provision contained in Stat. 1902, c. 453, s. 4, amending R. L. c. 57, s. 91, that "sealers of weights and measures shall cause the provisions of the seven preceding sections to be enforced in their respective cities and towns," it is within the scope of the powers and duties of sealers of weights and measures to institute complaints for violations of the statute in selling coal short in weight; and therefore, an offer of money to a sealer of weights and measures to induce him not to institute such a prosecution is bribery of an officer within the meaning of R. L. c. 210, s. 6.

Although Stat. 1907, c. 394, as amended by Stat. 1911, c. 163, making it a crime to give or attempt to give false or insufficient weight or measure, is not by its terms an amendment or extension of R. L. c. 57, s. 83–90, regulating the sale of coal and providing punishments for giving false weight or measure, it is in effect such an amendment and thus is a part of the law relating to the sale of coal.

A deputy sealer of weights and measures, appointed under R. L. c. 62, s. 18 by the mayor and aldermen of a city or the selectmen of a town, is a "municipal officer" within the meaning of R. L. c. 210, s. 6, providing punishments for bribing or attempting to bribe certain officers.

A deputy sealer of weights and measures is included by the word "sealers" as used in Stat. 1902, c. 453, amending R. L. c. 57, s. 91, and, therefore, such a deputy is authorized to make complaints for violations of R. L. c. 57, s. 83–90, relating to sales of coal; and an offer of money to induce him not to institute a prosecution for such a violation is bribery under R. L. c. 210, s. 6.

Daniel W. Bates *v.* Selectmen of Westfield and another, 222 Mass. 296.

Stat. 1920, c. 500, providing that "No veteran who holds an office or employment in the public service of the Commonwealth or of any city or town therein, shall be removed * * * except after a full hearing," was designed to protect only those persons who were appointed under the civil service law as veterans, and does not apply to a person who, being a veteran but irrespective of that fact, was appointed under R. L. c. 62, s. 18, a sealer of weights and measures of a town for one year and who continued to perform the duties of that office without another appointment for five years after his term of office had expired and for more than a year after Stat. 1914, c. 452, took effect.

Stat. 1914, c. 452, providing that in cities and in towns having over 10,000 inhabitants sealers of weights and measures shall be appointed to hold office during good behavior instead of for one year as provided previously by R. L. c. 62, s. 18, had no effect to change the terms of office of sealers of weights and measures then holding office or to create a new tenure for one whose term of office had expired and who was holding over as an officer *de facto*.

Stat. 1904, c. 314, regulating removals from office in the classified civil service, protects the holder of an office only during the term for which he was appointed, and has no application to a person whose term of office had expired before his alleged removal and the appointment of his successor.

NEBRASKA

For a discussion of Jay Burns Baking Co. et al. *v.* Charles W. Bryan, as Governor of the State of Nebraska et al., 264 U. S. 504, reference may be made to the paper on "The recent decision of the United States Supreme Court on Nebraska bread law," appearing on pages 51 to 59, inclusive, of the report of the Seventeenth Annual Conference on Weights and Measures.

TEXAS

Ex Parte Humphrey, 244 S. W. 822.

Chapter 138, sec. 8, acts thirty-sixth legislature (net container act) was held invalid as not definitely defining the commissioner's power to allow reasonable tolerances and exemptions. The power, as attempted to be granted, was couched in terms too general to become a valid part of a criminal statute.

Overt *v.* State, 260 S. W. 856.

Chapter 53, acts second called session, thirty-eighth legislature, (second net container act) was held invalid as being harsh and oppressive to such an extent as to render the act practically incapable of enforcement and violative of the Constitution of the United States, amendment 14, and the Constitution of Texas, art. 1, sec. 13, relative to remedy by due course of law. The act was also held unconstitutional because of the impossibility of determining who might be guilty, since corporations, associations, and joint-stock companies named therein could not be brought before the courts in person and prosecuted for violations of the act, which was, therefore, held to be unreasonable, indefinite, and of doubtful construction, and its material parts to be unintelligible, harsh, oppressive, incapable of enforcement, and invalid as depriving citizens of property without due process of law.

Graham *v.* Hines, 240 S. W. 1015.

In order to constitute a crime, the act condemned must be defined with such certainty that the citizen is able to know in advance from the written statute what is the act or omission which is made criminal.

Watts *v.* Weidemeyer, 61 Texas 184.

One not the public weigher may keep scales in a city and solicit orders for weighing cotton and other produce, without thereby becoming liable to the public weigher on *quo warranto* in the absence of a statute prohibiting him from doing so.

Paschal *v.* Inman, 157 S. W. 1158.

The business of private weighing is a legitimate vocation and falls within those ordinary occupations which a citizen is privileged to follow as an inalienable right, subject only to the valid exercise of the police power.

Martin *v.* Foy, 234 S. W. 698.

A person other than the duly elected or appointed public weigher is entitled to engage in the business of weighing for the public after giving bond as required by chapter 76 of the General Laws of 1919.

GENERAL CONSIDERATION OF SUBJECTS OF INTEREST BROUGHT UP FOR DISCUSSION BY DELEGATES

The Chairman. This item on the program gives you an opportunity to bring up for discussion any items not on the program, but in which you are particularly interested.

Mr. Guthrie. Mr. Chairman, Mr. Griffith has asked me to introduce the question of the proper method of sale of sauerkraut. It is now being sold by weight and by both liquid and dry measure. I would recommend that it be sold by weight only.

The Chairman. That question came up first over 20 years ago. We will refer it to the committee on resolutions.

Mr. Blaylock. Mr. Chairman, I think this body should go on record as favoring the sale and buying of all commodities by weight, and the elimination of the dry measure altogether. It would be a great thing if my State would begin to buy and sell altogether by weight.

The Chairman. Your suggestion will be referred to the resolutions committee.

Mr. Schwartz. Mr. Chairman, I think this body is already on record as favoring it.

Mr. Blaylock. This is my first time here and I am very glad to have that information.

Mr. Sullivan. Speaking on behalf of the city of Wheeling, I may say that the milk question is a very serious problem in our city. Various men come in with various sized cans; I have destroyed some of the cans, but we would prefer to have milk weighed, as it would eliminate all the trouble we are now experiencing. I believe that the city of Wheeling, in general, would be highly satisfied if ice cream were to be sold by weight also.

Mr. Thompson. I would like to ask this question, Mr. Chairman. A cord of wood contains 128 cubic feet. What should be required when the dealer sells you a cord of sawed-and-split wood?

Mr. Dalziel. I would answer that question. In our State it has been ruled that 128 cubic feet of wood must be delivered in the condition in which the wood is bought—if you order a cord of 16-inch wood you must get 128 cubic feet of wood of this character.

The Chairman. I will remind you that there is to be a demonstration of the testing of gasoline after this session.

(Thereupon, at 5 o'clock p. m., the conference took a recess until Thursday morning at 9.30 o'clock a. m.)

(Following the adjournment there was a demonstration by members of the staff of the Bureau of Standards of the method used in testing gasoline for quality by fractional distillation.)

FIFTH SESSION (MORNING OF THURSDAY, MAY 27, 1926)

The conference reassembled at 10.10 o'clock a. m. at the Bureau of Standards, George Warner, second vice president, in the chair.

SOLVING WEIGHTS AND MEASURES PROBLEMS IN THE SOUTH

By H. L. Flurry, *Chief, Division of Weights and Measures, State of Alabama*

Mr. President, ladies and gentlemen, I have not written this paper in the style of a report, but I have written it with a steel pen which has been chilled, chilled by black and white figures of the cold facts of life. I hope that you will not take this paper as having been written with malicious intent, but more from habit, as I started my career as a teacher of mathematics. Consequently you can sympathize with me in the habits of life that I have formed in dealing with things in a cold-blooded manner.

In the discussion of the solution of weights and measures problems in the South we believe we correctly assume that these problems are practically the same for all the South and that there is a very nearly common solution to each of these problems. Just as in mathematics we sometimes find more than one solution so far as the details are concerned, but the principles to be handled and the results desired are the same, so in things pertaining to weights and measures the detail application of methods of solution should be and will be different to best obtain the desired results, due to varying State or even community conditions, but conditions of work to be met and the principles of enforcement to be applied are the same. Accepting this, we must admit that the field of service in weights and measures administration is so closely related in the entire South that a program which is getting results in Alabama will be of value in the casting of a program for other neighboring States, and while we are not posing as a model administration, we feel that in a discussion of this subject the experiences actually gone through and our methods of solving the unknown equations will offer some suggestions to others in the service and is in line with the request of the assignment to me. Thus I will endeavor to outline the program as now under way in Alabama from its conception with reference to the law, the preparation for an efficient enforcement, and the things encountered in that enforcement and our efforts to solve them.

In the early days a State weights and measures law was placed upon the statute books, providing standards for the State and counties, and certain legal weights per bushel, and assigning certain limited and inadequate equipment to the secretary of State's office and very limited powers to the judges of probate of the counties,

without any special duties of enforcement created. The necessity of having standards was recognized, but it has taken many years to teach us that an active enforcement of an effective weights and measures law is necessary in these days of trade in order to obtain "the giving to every person exactly what he deserves" and as commanded in Leviticus: "Just balances, just weights, a just ephah, and a just hin, shall ye have." In compliance with this demand a number of these old laws have been relegated to the archives.

Only in September, 1923, Alabama received a new weights and measures law as a part of the agricultural code of Alabama. This law was brought in through the efforts of a few who had visualized the needs and their solution. It was not brought about by a general demand for a weights and measures law. I make this point because you may have hesitated to undertake a piece of progressive legislation because of the lack of a public outcry or demand for it. The vision of progressive legislation should not be blinded by what is often only a failure by the general public to have a clear conception of the solutions to problems which they realize exist. We do and think very largely what those about us do and think and this is often the impedimenta of progressive legislation, but, as in most cases, the public has responded to the work in Alabama and we often hear the remark that the State should have been doing the work long ago.

At this point we will state briefly some of the scope and powers of the Alabama law. The State standards are those established by the United States Congress. The legal weights per bushel of practically all dry commodities sold in the State are set, and the weight is the rule of correctness rather than the dry measure of those commodities, although the use of the dry measure is not outlawed.

The mandatory duty of the organization of the State forces and the enforcement of the provisions of law is placed upon the State board of agriculture with the commissioner as chairman. This organization forms a division of the department of agriculture with a chief who is directly responsible for its operations. The size of the organization is not limited by the law. It is stabilized against changes for political reasons in the method of appointments. The allowance of $2,400 per year and all expenses enables us to maintain an efficient corps of inspectors. The amount of equipment is limited only by the demands for it and the funds available. Thus we are able from time to time to increase our efficiency in providing new equipment for new lines of work.

Counties and cities have the authority to organize such county units as are desired and to provide such equipment as is ruled necessary by the state superintendent of weights and measures. These organizations are correlative to the State in that certain supervision over them by the State is granted, and annual reports must be made to the State department. The State may issue from time to time rules and regulations for the guidance of county and city sealers. Both are authorized to operate under the State law which is often more effective than city ordinances in obtaining results. Uniformity of specifications and tolerances is had throughout the State due to this relation of city and county organizations to the State.

As is true in most States, the law provides for mechanical inspection of all weights and measures and weighing and measuring devices kept, offered, or exposed for sale, sold, used, or employed in proving the size, quantity, extent, area, or measurement of quantities, things, produce, articles for distribution or consumption, offered for sale, hire, or award. We are authorized to enter and to seize without formal warrant, to approve, or condemn the apparatus, and, if condemned, to stop from use until approved. Supervisory power over all weighings in trade is provided and under other sections of the agricultural code, all of which we are authorized to enforce, we may stop from sale and seize any short-weight products. Thus we have a tool of enforcement in addition to the power to seize such products for evidence as provided under the weights and measures act itself. I believe that the power to seize short-weight products and forfeit same to the State through legal process should be added to all weights and measures laws.

The question was brought up by some gentlemen Tuesday morning as to the shipping in interstate commerce of products sent into a State short weight, and the impossibility of handling that due to the fact that you can not go out of the State to prosecute a man of another State. We handle that in this manner: When a short-weight shipment is made, our dealers, who are educated to the fact, notify our department and we seize it before they so much as pay for the carload, so that the shipper is the sole loser. He must make it good to make good with his trade. Only last week we won a case in which three carloads of commercial feed were involved in the city of Birmingham. We also prosecuted one case in which the product was manufactured within the State, and also seized the car of products.

One of the most advantageous and beneficial powers provided is the power granted to the State board of agriculture to make rules and regulations for the purposes of the various acts, which shall have the same force and effect as the law. This gives a certain mobility which is desirable and almost necessary in certain weights-and-measures enforcement. These rules and regulations must be confined to the limits intended by the legislature in the creation of the power and are usually passed after legal advice. Under this power, the specifications and tolerances are adopted by regulation which permits their change in compliance with the improvement in equipment and the findings of our committee. These desirable changes can be brought about immediately rather than once in four years in Legislature of Alabama. It is sometimes hard to cause a legislature which is not versed in the scientific phases of the work to fully comprehend and to appreciate the full meaning and necessity for the detailed specifications and tolerances. By regulative methods properly limited, the necessity for comprehensive, technical, and scientific legislation is eliminated and a changing and progressing industry may be properly, safely, and justly supervised and promoted. Methods of enforcement must often be changed to meet changed conditions and newly arisen conditions and things which are within the purview of the law.

It has been interpreted that the State has the right to police new devices coming into the State and to exclude that which may be

classed as false devices under our law and to condemn and prosecute upon the condemnation. The regulation requiring submission for type approval was passed as a method of enforcement in mitigation, in a way, of a stricter enforcement authorized by the act itself, and to the same intention and for the working out of the same results in a quicker, more thorough, and more economical way.

Thus we feel that the law has covered the solution of the problems in so far as it goes and our task has been, since February, 1924, the preparation for an active enforcement of the law in a State almost entirely unequipped for a weights-and-measures administration, and for the expected revelation of some rather bad conditions.

In this preparation we visited the Bureau of Standards for a study of the work. We feel very much indebted to the bureau for the successes which we have met in the work. Such a visit is well worth the time of any State official. We have their personal experiences in the work and the benefit of their touch with the various States. Here we obtain a vision of the scope of the service and a correct conception of the field entered into and the tasks before us. There is no other place so well equipped for the study of methods of tests and of the type of equipment necessary for these tests. Since this is the place where the specifications and tolerances adopted and recommended by this conference and the bureau, and which should be used by every State, are promoted there is no better opportunity for a full understanding of their interpretation as intended by the committee on specifications and tolerances, and a proper application in fact. We feel that if every State which is beginning the work, and also those already in the work who have not taken advantage of the opportunity, if there are such, would make this study at the bureau, the question of lack of uniformity in weights-and-measures requirements and enforcements would be resolved.

Another benefit which we wish to acknowledge is the opportunity of having seen the practical workings of an efficient department in operation and the solution being applied to many problems common to all of us by the District of Columbia department.

In practice there are two requisites to success in weights-and-measures administration—proper equipment and hard work. The first is a prerequisite of the latter. I am wondering if there is a State which is sufficiently equipped to efficiently carry out all things which should go with the work. We are living in the hope of finally reaching that blessed status. A first-class field equipment for inspectors is necessary for the performance of the duties devolving upon them and for the forming of a proper conception of the work by the public. The inspectors are the ones who carry the work and its impressions to the people. If you have slipshod equipment or dillydallying inspectors, you are sure to reap an adverse criticism by the people. We have saved many doubting questions on the tests of inspectors by having an equipment that has a converting appeal to the citizen. We are also convinced that a State laboratory is essential. We now have under construction a nice laboratory space which is to be well constructed and completely equipped with testing equipment for official and commercial work, and equipment for keeping field sets in A 1 condition.

It has been our observation in the South that the work has been much delayed in its development by a lack of proper equipment on the part of the small organizations here and there which have undertaken it without a full appreciation of the necessity of a properly equipped inspector and office. As a result the work is done in a guessing attitude and manner, and the public immediately guesses it is not worth the cost; and I agree with them. Good equipment is expensively priced, but it is the only way to an effective work. I was raised on a farm and I do not believe in sending the hired man to plow without a plow.

When the prerequisite has been furnished, there should be a constant survey of the needs of the territory covered and a comprehensive plan to meet the needs, interwoven with a leavening of public support and cooperation by the continuous building of a public conception and appreciation of the work accomplished and to be accomplished. Before starting a program we familiarized ourselves with the various conditions, the different trade practices, etc., existing in the State, in order that a plan of procedure comprehending all needs in the order of their relative importance might be made. This plan was divided into programs of work according to the importance of the subject of the program. Weights-and-measures work must be done systematically. A plan must be had and it must include as far as possible all the functions of the law and needs of the people within its purview. You can obtain support for such work by furnishing to the people, through news items, addresses to clubs, fair exhibits, and various forms of printed matter from the department, the knowledge of what results are being accomplished, the conditions of interest to them, and information concerning the law and methods wherein they may be of service in having it complied with.

In determining the conditions and needs in Alabama we have what we believe to be a fair representation of the South since Alabama is a pioneer among the extreme Southeastern States in weights-and-measures administration and there are many which have not yet actively entered into the service. I will outline some of these conditions met and corrections applied in our work.

Mechanical conditions were found to be very bad in two respects. In the first place, the types of devices showed a low general average, not because there were not quite a number of the highest type of devices in use, but due to the many users of the family scales, household measures, old devices easily subject to fraudulent manipulation, etc. We are fast remedying this situation with reference to those already in use by condemning and seizing such devices in use and informing the people against future purchase of these. The type approval, previously referred to, is clearing the market of devices of the disapproved types except for the purpose for which they were manufactured. The proper labeling to the effect "Not legal for use in trade" upon such devices has placed a notice clearly before the purchaser that he is subject to the penalty of the law for its use in trade. As a result he hesitates to buy even though such devices be offered contrary to law. It has been necessary to require certain minor changes in the products of 23 manufacturers before they could be passed and entirely to condemn others for sale for use in trade.

We were quite amused when two manufacturers attacked our wisdom of requiring the markings "Liquid" and "Dry" upon liquid and dry measures, respectively, in the case of quarts and pints. The attack was that a quart is a quart and why the necessity of all the printing. Another manufacturer claimed that his scale complied with the specification with reference to the limit of motion of the beam in the trig loop—and it had no trig loop. We have received the whole-hearted cooperation of the manufacturers in working out these matters and feel that much is to be gained in raising the State standards of equipment.

Secondly, the condition of devices in use is rather astounding to those on the outside of the work. In order that the conclusions of mind as to the users of devices in Alabama may be mitigated we state that the conditions are in a very small per cent indicated as willful. They are largely due to a lack of appreciation of precision and the loss either to themselves or the public through small variations in weights and measures caused by careless clerks or incorrect devices. There exists much lack of information concerning devices in use. Much constructive good is accomplished by inspectors impressing upon the operator's mind the importance of common necessities, such as having a steady counter for scales and keeping them level and balanced, priming the pump in the mornings, etc. The devices are not kept clean. One inspector was cleaning the filth from a counter scale before testing it and caught a rat in it. The braid, used for protection in shipping, under the pivots of a computing scale was found still in the scale and worn out. The owner said he guessed the scale needed some new ribbons in it. We find cotton poises loaded or made lighter to balance the beam and we might continue naming such instances.

Our policy of enforcement is to clear up these misconceptions as far as possible, warn the owner against a recurrence, and, if the condition is not adjusted by the inspector, condemn the device for repairs or for destruction whichever the inspector deems proper. Only willful violators are prosecuted upon first offense. In cases of condemnation for repairs, we find it necessary to allow 30 days in which to have the device ready for reinspection. It is not allowed in use until approved by an inspector.

I might state that that seems a rather long time, but we deemed it necessary to have a uniform rule and to allow the same length of time in all sections of the State to have the scales put in proper condition before an inspection is made, and in the rural sections over which we have jurisdiction the 30-day period is necessary. The owner must report as soon as repairs are made and if this report is not received in 15 days after condemnation a follow-up letter is sent out. We have provided for the trading of a condemned scale only for new scales on condition that a sworn statement be made setting out the transaction, whereupon our records follow the scale which must be reinspected and approved before passing out of the hands of the agent of the manufacturer. This has worked very satisfactorily and answered the demand of merchants for a recognition of the secondhand value of repairable scales.

The condition of devices in use is best shown by the statistics on the work as follows:

Character of equipment	Correct	Incorrect
	Per cent	*Per cent*
Heavy-duty platform scales used for coal, cottonseed, etc	42.5	57.5
Dormant scales used for hides, fertilizers, etc	54.5	45.5
Portable platform scales used for produce, feeds, fertilizers, meats, etc	60.0	40.0
Computing scales used in groceries and markets	54.6	45.4
Counter scales used in grocery and hardware stores and markets	68.8	31.2
Spring scales	49.6	50.4
Counterpoise weights	68.1	31.9
Measures, liquid and dry	47.4	52.6

As a matter of special interest I will treat the cotton scales separately. Seventy-four per cent of the cotton beams in use at the cotton gins were found incorrect and 89 per cent of the hanging poises used upon these beams were found incorrect. Of course very little cotton is sold by weights obtained at the gins, but a great deal of cottonseed is sold by gin weight which is obtained in many instances by deducting the weight of the bale of lint from the weight of the seed cotton before ginning. It is figured by such ginners that the amount of sand taken out of the cotton in ginning will offset the bagging and ties added to the bale.

Cotton beams found in public warehouses and private warehouses operated by cotton buyers were found to be 25 per cent incorrect and the poises for these scales to be 75 per cent incorrect. Alabama's cotton crop for the 1925–26 year was 1,356,088 bales; according to the records upon the condition of warehouse scales over which the cotton crop is sold, as shown during the same year, there were 1,098,431 bales of cotton incorrectly weighed. If we estimate the average error at 3 pounds, which is very low, in our opinion, as it was a common thing to find errors of from 5 to 10 pounds, there was an error of 3,295,293 pounds or the equivalent of six thousand five hundred and ninety 500-pound bales in the case of the last crop weighings. It is also our showing that 60.1 per cent of all scale errors were against the customer and 39.9 per cent against the user.

Upon this basis, and setting the average price of cotton at 20 cents per pound, there was in Alabama last year a loss to the farmers of $402,684.80 in incorrect cotton weights due to the use of incorrect scales. This condition is being corrected through a condemnation of incorrect scales, mostly due to worn pivots and bearings, and in most instances an adjustment of the poise and sealing over the screw by the inspector so as to prevent future changes by the operator. A scheme employed by willful short weighers is to use a heavy poise for weighing cotton for purchase and to use a correct poise in weighing it for shipment. This practice is used by buyers purchasing upon their weights from the farm wagon and is one which must be inspected unexpectedly in order to find the loaded poise. We look with suspicion upon a cotton buyer with two poises for one beam. They do not usually buy the extra one for the pleasure of money spending.

Our work upon pumps has not been sufficient to warrant a conclusion, but it is our opinion that the conditions are very similar to those revealed in other lines. A comprehensive pump campaign is a program in this year's plans. I wish to state in connection with this that I have personally made a special investigation in the field of the use

of the 10-gallon pump which is filled from the zero mark and drawn off by eyesight rather than by mechanical stops. I want to say that we found variations, sometimes as high as 31 cubic inches, in very many instances on the 1 and 2 gallon deliveries, due to errors in setting. I do not think the conditions as we find them in the State of Alabama in the use of this type of pump, warrant its continuance. I do not see the use of passing specifications and tolerances which will force the mechanically operated pump to deliver to the customer that which belongs to him and yet permit another man to deliver, probably with all honest intent, a shortage many times the tolerance which we allow on the other.

The supervisional inspection of packages reveals 81.4 per cent short weight, 11.5 per cent overweight, and 7.1 per cent correct weight. The supervision of sales of ice, coal, butter, feeds, fertilizers, and general groceries in our State corresponds so closely to the general methods in all States that I shall only call attention to a few things accomplished. Ice dealers were in many instances carrying no scales and those having scales were not using them. We found many ice peddlers taking a 20-cent cut from the end of the block before dividing it into the usual number of cuts for sale. One lot of 27,000 pounds of butter was found to have a shortage of about $650 in value, and in many instances butter has been required to be remolded. Many coal yards were found delivering any amounts of coal ordered without having a scale. These were forced out of business or required to provide scales. Grocery stores were packing their products ready for sale gross instead of net weight and in many instances they were short by even a greater amount. Packages were not marked with the net weight. Repacking is required upon first offense and warning against future offenses is given. Corn meal coming from the small millers was as a rule very irregular in its weight and in many instances it was short weight upon the average.

We feel that the greatest causes of short weight in such products is a lack of appreciation of the weight of containers and wrappers and careless clerks improperly supervised. Criminal prosecution is never entered against this class of violaters for first offenses, but quite frequently we seize the products and secure a court order requiring that they be repacked. The court cost serves as a nice stimulant to the recollections of a careless mind.

Our investigations of special trade practices have revealed a lot of valuable information. Through this we have found a need for much legislation which we do not have at the present time. Among these needs is a standard bread law. I am sorry to say that we have no standard-weight bread law in our code, but we expect to have one. We have weighed bread from as many as four different bakers in the same store and found the weights of the different bakers varying from 12 to 17 ounces per loaf. These loaves were sold in competition with each other and are offered to the public for the same price.

A practice which must be overcome is the long-established custom by cotton weighers of weighing upon a slightly rising beam instead of upon a level beam, which they call a "dead" beam. If honestly used, such a practice would not be a serious consideration, since less than one-half pound will produce the effect. However, the practice

is generally abused and cotton is being weighed from 1 to 3 pounds short on account of the practice. An experienced weigher can easily "catch" a cotton beam, which is usually slow to start rising, with the poise set several graduations back of the correct weight and give all appearances of a correct weighing. We have not only prosecuted buyers for having fraudulent scales but we have had cases where cotton was placed upon the scales by the inspector after being weighed by the weigher with all appearances of just weights and the cotton would gain in weight from 10 to 12 pounds per bale. You understand this cotton was weighed in the presence of the inspector, although unknowingly by the weigher, and it appeared all right; the bales were rolled away, but were rolled back again on the scale with the above gain being noted. We never stop the investigation because the scales are found correct.

Buyers as well as public warehousemen must keep records of the weights of cotton, date received, and name of person from whom received for all cotton bought or stored, which are duplicates of records delivered to customers. A check of weights of cotton on hand against the records often shows conditions interesting to us and sad to the operator. Correct cotton scales do not mean correct cotton weights, due to the abuse of this practice. It is also one of the reasons, in our opinion, why automatic indicating scales have not obtained any degree of popularity with the trade for cotton weighings. A requirement of level beam weighings, as set by law, to supersede the old established custom of weighing a rising beam would be condemned by the cotton trade. Yet there must be a solution and we, for one, expect, if no other way can be found, to reap that condemnation.

Another problem of interest to the Cotton Belt and one which Alabama is undertaking to solve with some degree of success is the use of bagging and ties varying in weight from 17 to 30 pounds and compress patching of from 4 to 12 pounds per bale. Cotton must be bought on the basis of a heavy tare when such is often being used, thereby causing a loss to the user of light tare. The tare can not be weighed by the buyer and should be standardized; therefore, Alabama has set from 18 to 21 pounds as a standard for bagging and ties. It is also practically impossible to check the weights of cotton after going through a compress which is not using standard patching. A uniform law standardizing the tare throughout the Cotton Belt is the only solution.

Some of the arguments of the cotton buyers in this connection are that it does not reflect on the amount of money paid to the farmers, but my contention is that it does reflect on the amount of money paid to the farmers. Most of our export cotton is sold on what is known as c. i. f. and 6 per cent export contract, the bigger portion of it under the Bremen, Havre, and Liverpool rules.

Those rules are that the cotton tare shall be not in excess of 900 pounds per 100 bales for ties and $3\frac{2}{16}$ per cent for the gross weight less the weight of the ties for the bagging. When cotton merchants sell cotton to foreign countries on the basis of American money, 20 cents per pound, the price that they are really getting for that cotton is not 20 cents but 94 per cent of 20 cents, due to the reduction

of 6 per cent, which would make it 18.8 cents per pound. Then we deduct c. i. f. charges, which we might say are 1 cent per pound, and we have as a result 17.8 cents per pound, less whatever expense is had on this side in the handling of that cotton, so that I say the farmer gets the reflection of the use of the more modern beams. In other words, the American farmer who sells cotton does so on this basis Where he sells a 500-pound bale of cotton he is paid for 470 pounds. as 6 per cent of the 500 has been taken away, but he must furnish to the export market 473½ pounds, approximately. Who loses the 3½ pounds? Does the buyer lose it? No. Why? Because the price is based upon the Liverpool price or the foreign export market, and the deduction is always made. Who loses the 3½ pounds of that bale of cotton due to the lack of standardization of the tare? The farmer, because he must furnish that 473½ pounds of lint in that bale which is sold for 470 pounds, due to the lack of standardization.

In other words, if we figure the price as we figure the cotton, the farmer would not lose except as the buyer made him take care of it in the adjustment of the prices. Under the present system there is no question but that the farmer of the South is losing heavily on account of the lack of a standardized tare. We can not as a State regulate the compress packing but we can regulate the standard tare for the bale when it is baled. The compress packing becomes an interstate proposition, therefore, we can not exercise control over it.

But think of not only the losses in the price to the farmer but the economic loss in the lack of the standardization of the cotton tare when the various markets, even of our own country, have different tare rules and the compresses must press their shipments of cotton to conform to the rulings of those markets. Take, for example, a bale of cotton which is going to a market which is allowing 26 pounds for tare. It only has on it when it reaches the compress 21 pounds of tare. That compress man is going to add on enough tare to take care of that. The mills are not paying for that tare. They have no use for it. It is of little value. Some of it is rerolled or resold but it is sold for a very small amount, an insignificant amount as compared with the loss in handling cotton under those conditions. The mill is paying for the actual lint received just as all manufacturers pay for the products they can use and these other things are figured in the price. Not only that, but there are thousands of dollars lost each year due to the storage of cotton in the bales which can not be compressed due to the fact that the compress does not know to what market it is going, therefore, they do not know to what tare to adjust it for the respective market.

Another question similar to cotton tare is that of sand in seed. About 80 per cent of the gins in Alabama remove the sand from the seed cotton. Some keep it out and many place it back into the seed. It is an economic loss to allow sand to be sold in seed, although the price is made on that basis. Seed should be cleaned at the gin and sold by actual weight instead of by estimated figures.

As we find it in Alabama generally the ginneries estimate the sand in the seed as offsetting the additional tare to the bales of raw cotton. We say that practice should be discontinued and that the

cotton should be bought by actual weight and it should be cleaned in the process of ginning and kept clean. What is the use of cleaning it and then putting the sand back and having all the mills repeat the process, in addition to paying freight on the sand from the shipping point to the mill?

There are many other problems for the South, which we are endeavoring to solve, but I shall not make the discussion any longer. It is our opinion that a constructive and progressive program enforced in a reasonable and considerate and not-too-hasty manner, always abolishing old-established customs in a way which justifies their going in the minds of the people, is sure to receive the support of the public in the South.

The Acting Chairman. We seem to be particularly favored this morning. Almost from the opening of the conference we have heard more or less about standard loaves of bread and I am pleased to state that we have with us to-day Congressman Charles Brand, of Ohio, who is author of the Federal bread bill now in the House of Representatives. I will ask Mr. Brand to say a few words.

REMARKS OF HON. CHARLES BRAND, MEMBER OF CONGRESS, SEVENTH DISTRICT, OHIO

Mr. Chairman, and members of the conference, this is the second time I have appeared before your body. It was a pleasure to be asked the first time and it is a compliment to be asked the second time, a compliment I do not always receive. This is the first time I have been out here since the ground was purchased in the front, which is such an improvement to the Bureau of Standards. I am pleased to say I am a member of the Committee on Buildings and Grounds and helped in persuading Congress to buy that ground.

As a member of Congress studying the different departments I lean toward the Department of Commerce. I am a business man. I am not bothered by all the details that bother lawyers. You know nearly all the departments of the Government spend the people's money. This department makes money for the people of America, and that makes me like it, and I enjoy whatever they are doing out here. I enjoy what they are doing all over the world.

You are very fortunate, extremely fortunate, in the head of this department. I think it is fair to say that you have the greatest commercial man at the head of this Department of Commerce that we probably have had in this country since the day of J. Pierpont Morgan, sr. There is a great deal over the world in just his name, and it is a great help all over the world to have Mr. Hoover at the head of the Department of Commerce.

I was over in Europe about a year ago and I found that gradually I lost interest in looking up things over there. I found myself gravitating into the embassies and up to the offices of the commercial attachés representing this department of the Government. I just could not help it. In London, Paris, Rome, and Athens I found myself spending my time in their offices. Why? Because I saw there this great work going on of America capturing the markets of the world. Just think, the exportation of our products has increased in the last five years 40 per cent, all under the guidance of this great Department

of Commerce. How do we do it? You know we pay more wages than they do in producing these articles.

As to automobiles, I saw the Fords running around thicker than any other car and I found that the wages over here in the Ford factory were twice what they were there, and I found that iron costs less over there and everything that went into that automobile cost less and, in addition to that, they had to pay $200 base tax coming in and yet they were selling at full price plus that tax or tariff. Why? How can it be done? I could spend an hour telling you how, but let me give you a fundamental reason. Why, in America we have opportunity—opportunity to change our status. We can let our brain work and every man can get into a position equal to the power of that brain. That is not so in Europe. There a man just stays where he starts; he does not attempt anything new; he does what his grandfather did. But over here we do new things in new ways and Henry Ford found out how to pay twice as much wages, how to pay more for everything he puts in a car, and yet overcome the competition over there.

Why, I might talk to you about telephones. While I was over there, through the instrumentality of the Department of Commerce officials, I saw $90,000,000 of telephones, American telephones, sold in Europe. And there is a reason for it. If you do not believe it, try their telephones.

I saw a contract for $10,000,000 worth of waterworks made in Athens in the office of the commercial attaché from this department. I saw it engineered throughout. Why, in Athens they had a waterworks system built by one of the Cæsars that allowed the water to run down hill through an aqueduct, and it produced the same amount of water for that population of 1,000,000 of people as it originally produced when the population was 30,000. They do not know anything about pumps; they just know about water running down hill, and that is awful when it comes to fire protection because they do not have any standpipes. When they have a fire they have a tank attached to two horses just like we have for a threshing-machine outfit, and they rush down the street with that tank and after they throw the water on the fire, why then the fire just goes on. And so I was glad to see a contract made for $10,000,000 worth of water-pumping machinery and an outfit for the city of Athens made through our governmental officials. I am wonderfully interested in the work the department is doing abroad and I am wonderfully interested in what the Bureau of Standards is doing here. Let me illustrate:

The sugar laboratory of the Bureau of Standards has increased in the last year or two the receipts in the Corn Belt $750,000,000 a year. Now the plan is not quite complete, but anyone with a little vision can see it. For years we have made glucose out of corn and that was in the liquid form, and for years and years the scientists have tried to precipitate that liquid into crystallized sugar like granulated sugar, and up here they finally found out how to do it commercially; and now we have granulated and powdered sugar made out of corn, and we have got too much corn in this country. Now you begin to see why it is important. We raise 3,000,000,000 bushels of corn, and that is ruination to the farmers.

The Bureau of Standards is doing wonders out here. Just think; this department can raise the income of the farming population of this country $750,000,000 a year by a new use of corn—why that is $200 apiece for every farmer that raises corn in America—all in a little chemical laboratory.

Now, for fear I forget it, I had better talk a little about bread. This reminds me of a man going late into an audience and sitting down in a chair next to another; he leans over and says, "What is the man talking about?" and his neighbor says, "He has not come to that yet."

How many people here represent States where they have no standard-weight bread law? How many of you want one? Well, you are going to get one.

We are going to put this trust in such shape that they will quit going around to the legislators asking them to keep a bread law from going through that means business, and make them change their tactics so that they will come on their knees and beg you to pass one. That is what we are aiming at.

Before the Agricultural Committee of the House came the bread bill for consideration, and the trust sent down a lawyer to present their side of the case. The only people in the United States now that I can find who are opposed to standard-weight bread is this so-called Bread Trust. All of the little bakers of the United States want it. They want fair competition; they want to know that their competitor is making the same sized loaf that they are. After three years' experience in Ohio with the bread law of which I was the author, the bakers of the State came together in convention and unanimously indorsed the law. That is good proof that it suits the baker. And do you know I have never heard a consumer in the State of Ohio objecting to the change of receiving 16 ounces of bread instead of 12 and 14 at the same price. I have never heard one complain.

The bakers are getting about $100,000,000—no; they are not getting that much themselves—they are depriving the consumer of about $100,000,000 worth of bread a year by pinching off a bit from the loaf; and you know that only saves to them about $25,000,000 to $30,000,000 because all they save is in material. and the materials are only one-fourth to one-third of the cost of the selling price of the bread. It costs just as much to bake a loaf weighing 14 ounces as it does to bake a loaf weighing 16 ounces. It costs just as much to haul it around and to handle it whether 14 or 16. It costs just as much to wrap it; it costs just as much to keep books; it costs just as much overhead. Well, this lawyer said it would cost a little more he thought to haul 16 ounces than it would 14 ounces, but I retaliated and said there would be a saving in hauling the money down to the bank and the checks would not need to be quite so large at dividend time.

I got the law through in Ohio and we raised the weight from 12 and 14 ounces up to 16 ounces without any increase in the price of bread; and wheat was worth about 85 cents a bushel when we passed the law, and wheat has gone up until now it is about $1.65, and the strange part of it is that the price of bread is just the same whether wheat is 85 cents or $1.85. There is another strange

thing, and that is that if we did not have this law the price of bread would be just the same as though it were full weight.

I can not find that it has ever cost the consumer any increase anywhere in the United States when you standardize the weight of a loaf of bread. This is just what a little baker down in Cincinnati told me was his "bonus." He said "Every week I can put away just what I make on that bonus, and do you think I am going to be wanting the law to be taking that bonus away from me?" And yet the big men in the baking industry of Ohio have come to know that an honest loaf pays, and they are satisfied.

Now, gentlemen, there is an obligation on the part of you men here in helping to get a Federal standard bread law. I think that it would be wise, if you believe in the law, for you to indorse it, and then when you get home I think you should write each member of Congress and every member of the Senate from your State, stating the results of the action of this meeting and explaining why we need the United States law.

To explain the relation of the United States law to the State laws let me give you an illustration of how it would work out. If a baker in New York City wished to ship bread from New York City into New Jersey and this United States law were in effect, he would not be able to ship across the State line anything but full-weight bread. When his bread got into New Jersey it would meet in competition short-weight bread, and immediately the result would be that the New York baker would come down before the New Jersey legislature and get on his knees and ask for standard weights in New Jersey. Is that clear? I thank you.

Mr. Cummings. Mr. Chairman, I would like to move that this conference go on record to the effect that we favor the Brand bread bill and that we will do all we can with local Congressmen and Senators to support that bill.

(The motion was seconded, the question was taken, and the motion was agreed to.)

TRAINING THE PROSPECTIVE HOUSEWIFE [13]

By E. L. Redfern, *Sealer of Weights and Measures, State of Iowa*

The weights and measures official may keep the scales, weights, and measures in his jurisdiction in good condition, and of the proper design and construction, so that when they are properly used the consumer at all times will receive that amount for which he pays; but even when he has accomplished this his work is only partially done. Unless there is a continual use of educational methods with the public, there will be little advancement, and routine inspection will be the limit of his accomplishments. Talks and demonstrations before women's clubs should be made as frequently as possible, with the use of pictures if available. We can not progress in our work unless we keep the buying public informed on what we are doing to protect them and make them familiar with some of the problems we encounter.

[13] This paper, prepared by Mr. Redfern, was read to the conference by C. S. Bogle, chief record clerk, Iowa Department of Agriculture.

In general, we have not been able to teach the housewives of to-day to buy intelligently, and only in rare instances will you find a scale in the home for checking the weights of the various commodities which are purchased. The existence of the dishonest peddler of vegetables and fruits is possible because there are housewives who will buy his products without regard to the weights he delivers.

In Iowa, for many years, we have been trying to teach the housewife not to buy of the peddler unless she has a scale and verifies the weights of her purchases. The peddler of fruits and vegetables is most active in the fall, and considerable time is required of the inspectors in checking their scales and deliveries. In most cases this class of dealers carry a cheap spring scale, and are inclined to use it only when the housewife demands it or they are fearful that an inspector may happen to be near.

During the past three years in Iowa we have been conducting educational work with the young women in the Department of Home Economics at our State College. There is an average of 350 young women each year who take a course of study in this department of the college which is known as "Home marketing." It has been the privilege of the writer to lecture to this class of young women each quarter of the school year, and to the summer class, on food-control work and weights and measures. Much stress is laid in these lectures on the application of weights and measures to home buying. These students each quarter are brought to Des Moines to visit the food industries and the office of the State sealer, where they are shown the State's standards of weights and measures and their application and use are explained and demonstrated. Much interest is shown by these young women in this work, and as the housewives and mothers of the immediate future, we believe they will buy much more intelligently than the present housewives and mothers.

It is a known fact that the young are much easier to teach than the old. We all know that the present housewife does not readily change her methods of buying, in spite of the fact that weights and measures officials have for many years published bulletins on the application of weights and measures to home buying.

I believe much can be accomplished in our work if the weights and measures officials of every State would arrange with the departments of home economics in their State colleges for a series of lectures on weights and measures before these young women. There are thousands of students in our colleges studying to become good housewives and mothers, and we are missing a splendid opportunity if we fail to give them proper weights and measures information.

DISCUSSION OF ABOVE PAPER

Mr. Schwartz. Mr. Chairman, in following up the paper of the gentleman from Iowa, it might possibly be of interest if some of the delegates could be heard from as to the methods used in their States along these lines. The paper, to my mind, is very timely and one that should be of some material benefit to the State departments which do not follow the course of instructing the housewives of the present as well as the housewives of the future.

We have done some work along this line in our State which I may outline briefly as follows: The education of the housewife or prospective housewife is carried on by the State department of weights and measures through lectures from the platform, the distribution of useful literature, and by newspaper publicity on matters pertaining to weights and measures and trade practices involving the determination of quantities. We lecture before various civic organizations, principally the women's clubs, and, in addition, have recently extended the scope of these talks to include the schools, as we must recognize that in the latter are to be found the bread winners and housewives of to-morrow.

We now have in prospect the modernizing of these lectures by the use of projecting machines with which to illustrate the talks given, as we believe this method will produce best results and have a particular appeal from the standpoint of interest to the student. This feature can be extended to include short moving-picture reels showing the various phases of weights and measures regulation and how it is carried on. Lack of funds for this educational work has held up this innovation, but we hope to put it into effect before the end of the current year. Also during the past year we have had exhibits at the county fairs held in both the northern and southern sections of the State which have resulted in much good. We put on exhibits showing the number of weighing and measuring devices that have been confiscated, showing how they were operated, and set up along side of them the standard, up-to-date weighing and measuring devices; and, in addition to that, we have had the exhibit of the former dry measures, and an exhibit of how they could be manipulated, and an exhibit of that character was very interesting, particularly to the people coming in from the agricultural districts. In addition to that, we distribute our literature.

Keeping our work before the people is a good plan that can not be too intensively pursued. Awakened public interest helps materially with projects having for their purpose the perfecting of our statutes and the obtaining of appropriations for efficiently carrying on our work.

Mr. Estes. Mr. Chairman, it might be interesting for the members of the conference to know of a plan which we followed in Flint. We went through the schools talking about the weights and measures work, and we conducted a little examination, and some of the answers that were put down on the examination papers were surprising. Then as a wind-up we asked all of the students to say whether or not the scales in their particular neighborhood were in proper balance. That is one of our problems. Scales usually are fast, and we notify the grocer what seems to be wrong, and what will have to be done, and explain that it is also for his own good. We also follow up to see whether or not the scales are kept in balance, and I believe the results are good.

The Acting Chairman. In relation to the next paper, "Weights and measures prosecutions," which will be given by Hon. A. H. Andresen, I wish to state that Mr. Andresen has had practical as well as theoretical experience in weights and measures work, having been a weights and measures official for four years in the State of Minnesota. He is an attorney by profession and understands our problem

from both the theoretical and practical side. He also is, I think, the only former weights and measures official that is now in Congress. We will be pleased to hear from the Hon. A. H. Andresen, Member of Congress, third district of Minnesota.

WEIGHTS AND MEASURES PROSECUTIONS

By Hon. A. H. Andresen, *Member of Congress, Third District, Minnesota*

Mr. Chairman, and ladies and gentlemen of the conference: I am pleased to note the indorsement of Mr. Brand's bread bill. I am on the committee in charge of this bill, and I am going to take a great deal of pleasure in advising the members of the committee that the members of this conference are heart and soul in favor of a standard unit weight for bread.

When my friend and former coworker in weights and measures, Ralph W. Smith, of the Bureau of Standards, called on me a short time ago and invited me to be present at this conference, it was with a great deal of pleasure that I accepted the invitation. I feel highly honored to be here to-day, as a former weights and measures official, to take part in the discussion of the work in which you are so vitally interested, and upon which our social and business structure is so largely dependent.

In my opinion, no branch of the Government, either State or National, performs a more direct beneficial service to the public at large than the service rendered by the National Bureau of Standards and the various weights and measures bureaus throughout our country. Nearly every business transaction, whether by housewife or business man, is in some way dependent upon proper supervision and enforcement of weights and measures laws. The housewife and business man, in fact every consumer, is entitled to receive full weight, full measure, and full count in making a purchase or trade of any commodity, and it is therefore incumbent upon the conscientious weights and measures official to ascertain if the weighing and measuring instrumentalities used in trade meet the requirements of the law, as well as to give constant and intelligent supervision over the daily business transactions affecting the necessities and comforts of life.

It is unfortunate that Congress has remained silent in the establishment of uniform weights and measures regulations throughout the United States, but I hope that the time is not far distant, when, through the splendid work done by the Bureau of Standards and cooperation with the several States, we will have proper weights and measures laws on our Federal statute books, so that we may have national uniformity in weighing and measuring equipment, as well as a nation-wide standard unit of weight or measure of any commodity, in order that the cumbersome burden may be lifted from the now existing condition of possibly having 48 different weights and measures laws in so many States, into one national law with the Bureau of Standards in full charge to promulgate rules and regulations.

I do not want to be misunderstood in the statement I have just made. It is not my purpose to advocate national enforcement of all

weights and measures laws, for I feel that it is highly essential that the various State and city bureaus of weights and measures should continue with their splendid work, and that with the adoption of a national weights and measures law it will serve as a guiding standard for the various States and at the same time materially assist local officials in their supervision and enforcement work.

In the early days of weights and measures supervision in Minnesota it was my good fortune to be associated with the Hon. Charles C. Neale, whose name is a household word in every scaleman's home, and under his protecting wing I was placed in charge of weights and measures prosecutions in our State. In view of my experience in this line of work, I have been asked to address your conference upon the subject of "Weights and measures prosecutions."

In discussing this subject, I would first define weights and measures prosecutions as being a systematic, as well as sympathetic, course of education in honest dealing; a lesson in eliminating carelessness from business transactions; a lesson in business methods and efficiency; a means to an end, the end being a higher standard of business dealing as a result of proper weights and measures supervision and prosecution.

The conscientious official will be welcomed by both the buying and selling public if he enforces the laws with discretion and judgment. He can be of great help to the careless merchant or vendor in correcting objectionable evils. We can not, of course, sanction repeated and open violations of the law, but when the weights and measures officer finds upon his first visit of inspection that short weight or measure has been given unintentionally, possibly through carelessness of an employee, who certainly does not profit by it, or by the proprietor himself, in the rush of business, it would appear that it would be proper to call attention to the violation and give the offender an opportunity of correcting the evils. A second offense, after warning had been given, should be prosecuted to the fullest extent. Intentional violations as evidenced by a deliberate intent to defraud should be severely dealt with in order to protect the buying public.

I am frank to admit that at least 75 per cent of violations of the weights and measures laws are due to carelessness and ignorance of the vendor. The average merchant is honest, and has no desire to give short weight or short measure to his customer. On the other hand, we find the merchant who buys his potatoes from the farmer by weight—60 pounds to the bushel—selling them to the consumer by measure in the so-called bushel basket, giving from 45 to 60 pounds, depending largely upon the heap of the commodity in the basket. There is no excuse for such dealing.

A great deal of care should be exercised by the official in securing the evidence for his case, as the success of the prosecution depends largely upon the official carrying out the law to the letter.

In the first place, the official should equip himself with a complete set of tested standards, as it is generally advisable to check up on your commodity in the presence of the vendor or purchaser, in order to discover apparent errors in weighing or measuring. By having such equipment near at hand, you can also test out the

accuracy of the weighing and measuring devices used by the merchant.

As soon as the evidence has been secured, and the test on the ground discloses that there is a deliberate attempt to defraud, it should be taken to the weights and measures office by the official, particular care being taken that the purchase remains in its identical condition and that it has not been out of the hands or sight of the inspector. Upon arriving at the office, a second test should be given by using the secondary standard, and then marks of identification and results of official test, should be placed upon the package, if not a perishable commodity. The package of evidence should then be sealed and placed in a secure and safe place until it is used in the trial of the case.

It would be difficult to lay down hard and fast rules for a weights and measures official to use in securing his evidence. Obviously, it would not be well for him to pin his official badge on the outside of his coat and come walking into a place of business with his measures and equipment in his hands. In my experience I have found most success in taking the part of a regular human being—a real customer—one who has a purchase to make. The keen official will at a glance observe the condition of the weighing or measuring equipment used, and in making his purchase, he will ascertain the price per pound of the commodity before making his request for 50 cents worth of cheese or beans or hamburger, or whatever it may be in his mind to purchase. A casual glance at the indicator on the scale during the weighing operation will disclose if full weight has been given. In paying for the purchase it is always well to ask for a sales slip showing the number of pounds of the commodity purchased and the price per pound. Such a sales slip becomes a valuable document in the trial of a case for short weight.

It is the custom of the public nowadays to buy by the money's worth, as, "25 cents worth of boiled ham" or "15 cents worth of potatoes," and I think the weights and measures officials have a great duty to perform in educating the people to come in and ask for 1 pound or 2 pounds of this or that and then check up on the purchase. Of course, these scales that register 25 cents worth, and so on, are a great convenience to the merchant, but those same scales also register the pounds and ounces, so there is no difficulty in a successful observation of the scale by the customer or the merchant so that they can readily and quickly check the actual amount of the purchase.

If the inspector believes that short weight has been given, it would be well for him then to disclose to the merchant his identity, and proceed to reweigh the commodity upon the merchant's scale, so that the merchant's attention may be called to the discrepancy. The scale should then be tested and if found inaccurate, immediate adjustment made or the scale tied up for future inspection.

If the circumstances warrant, and the inspector is satisfied that the short weight was made with the intention of defrauding, or if it should appear from the records that the case was a second offense, the official should proceed with immediate prosecution.

After due care had been taken in protecting the evidence the inspector should go to his prosecuting office, present the facts in

clear, logical order and request the drawing of a complaint to cover the violation. In large cities, the city attorney generally has charge of such cases in municipal court, but if the city attorney is not available, or refuses to act, it is always the duty of the county attorney or the attorney general of the State to handle the preparation and prosecution of the case. Ordinarily, a common form is used in the drawing of the complaint, and it will not take much experience on the part of the inspector to prepare his own complaint after he has handled a few cases with the prosecuting officer.

The complaint is then signed by the weights and measures official and turned over to a peace officer for service upon the defendant. In some cases it is desirable to have the individual who makes the purchase sign the complaint. For instance, if a lady goes into a store and makes a purchase and it is found that she has been given short weight, then I would say that it would be proper for this lady to sign the complaint rather than the weights and measures official. Sometimes the defendant is required to deposit bail until preliminary hearing can be had, but ordinarily he is permitted to appear at the next term of court to enter his plea of guilty or not guilty. If he pleads guilty, the court imposes a fine or sentence and the case is ended. If a plea of not guilty is entered, a day is set for trial. At the trial of the case the burden of proof is upon the State to show that short weight has been given and the law violated by the defendant. If the defendant does not demand a jury trial, the case is heard by the court, in which event the judge determines both the facts and law in the case. The official should now produce his evidence and sales ticket, relate all facts incident to the purchase to the court and in every way assist the prosecuting attorney to substantiate the facts alleged in the complaint. A safe rule to follow in cases of this character is: Never go into court unless you are prepared to prove to the letter every element in your case. The attorney for the defense is going to ask you every conceivable question. I would advise the weights and measures official to get one or two cases and finish them rather than get a number of cases and go into court and try to remember them. It is a physical impossibility to remember all the details of a case. I imagine you have men here who have gone through the same experience that I have.

After several cases have been tried in court and the judge has become impressed with the fairness of the weights and measures official—and it always pays to be fair—the court will regard the official as an officer of the court and will often rely upon the judgment and recommendations made by the official in passing upon the case.

The publicity derived from weights and measures prosecutions is of untold value in a community. The effect is far-reaching, as it is not only a lesson to the particular offender but it informs the buying and selling public that the laws are being enforced for the protection of the consumer, and it inspires vendors generally to improve their business practices.

Frequent inspection often discloses the fact that a merchant or his employees give overweight or overmeasure as often as short weight or short measure is given, and such supervision will help

correct these evils with a resultant benefit to the merchant as well as a protection to the consumer.

Some time ago I spent a day with a weights and measures official, who is now present, and in order to give you an idea of his work I want to take you along for the day's trip. We started out at 5 o'clock in the morning for a trip to the city market. Considerable time was spent in looking over the spring scales used by the hucksters and in checking up purchases made by various early shoppers. We were standing near the booth of a meat vendor when a certain Mrs. Jones came up to buy a ham. She asked the price per pound, which was 20 cents; she selected her ham and paid the sum of $1.75 for it. The inspector observed the transaction very closely and when the sale was completed he stepped over to the lady and said, "Pardon me, lady, but I am a weights and measures official, and I would like to see if you have received full weight in the ham you have just purchased." The lady was delighted. The inspector weighed the ham on the vendor's own scale and found its weight to be exactly 8 pounds, and that short weight had been given to the extent of three-fourths of a pound. A police officer was called by the inspector and given orders to have the vendor at the police court at 10 o'clock the same morning. The purchaser was also notified to be in court to testify, and we proceeded with the ham to the weights and measures office for the purpose of determining the official weight and record.

At 7.30 o'clock we proceeded to drive out in the residential part of the city, and for the better part of an hour the inspector was busy checking up on the weights of ice delivered at that hour of the morning. No serious discrepancies were found.

At 9 o'clock we were at the office of the city attorney and a formal complaint was signed against John Doe for selling short-weight ham to Mrs. Jones.

Promptly at 10 the municipal judge entered the court room and proceeded to dispose of the usual run of the calendar. Then Mr. Doe was called before the bar of justice and entered his plea of guilty of selling short-weight ham to Mrs. Jones, whereupon the judge gave him a good lecture in honest selling and fined him $20. The fine was paid, the 15 cents overcharge and the ham returned to Mrs. Jones, and she went away happy. The defendant went to his business with his lesson, and Mrs. Jones returned to her home with the feeling that the State was looking after her interest.

Upon returning to the office, we found a complaint from Mr. Roe to the effect that he had received short measure in the purchase of a cord of wood. At 1 o'clock we arrived at Mr. Roe's home, ranked the wood for measurement, and found that he had full measure with a few sticks to spare.

We then proceeded to check up a load of coal and found a shortage of 60 pounds in a load of 2 tons. A record was made of the inspection so that the fuel dealer could be given warning by the department.

We visited several grocery stores and meat markets, checked up packages ready for delivery, adjusted scales, and gave instructions. In weighing up 2 pounds of hamburger the meat dealer accidentally weighed his thumb resulting in a shortage of 3 ounces. Another case for the next day.

Before returning to the office the inspector purchased 5 gallons of gasoline in his own 5-gallon can, which was found to be full measure upon the official test.

Upon returning to the weights and measures office I found that the inspector carried with him the following equipment: One tested spring scale for weighing ice and potatoes, etc.; one pair of ice tongs; one tested 1-gallon measure; one glass graduate; one tin funnel; one 5-gallon tested measure; one set of small weights; and a complete set of tools. After we had removed this load to the office the weights and measures official stretched and sighed, "Nothing to do until to-morrow."

And so endeth the day for the protector of the buying and selling public.

DISCUSSION OF ABOVE PAPER

Mr. Schwartz. Mr. Chairman, I think the paper just read was a mighty instructive one and one which outlined procedure which all weights and measures officials should follow. We in New Jersey have proceeded practically as the Congressman has advocated in his paper, but there have been one or two matters which we feel are of sufficient interest to bring to the attention of the delegates at this time.

In prosecution work, and with particular reference to the development of cases, a practice which strongly appeals to us in New Jersey is the enlisting of the cooperation of the police authorities in running down violators. The present methods of weights and measures enforcement in our State (and we believe they are common to others) make it physically impossible at times for weights and measures officials to apprehend violators as quickly as would be desired, particularly where the transient or so-called fly-by-night merchant of the peddler class is concerned. To cite an instance: Only two weeks ago we had a complaint come in to the State department that a peddler was selling hams short weight to the extent of from 2½ to 3 pounds on a single ham. This particular merchant was operating in Trenton, where our office is located. We were not able to relay the complaint to our local men who were in the field performing their general daily routine; and as the matter was one that required quick action, we solicited the assistance of the police, after first securing sufficient evidence on which to prosecute, giving them a description of the peddler and his vehicle and asking that he be "picked up." Even with this dragnet out it took three days to get this man, but he was caught through police vigilance and brought to trial on five distinct charges, which resulted in convictions on each charge and the imposition of $200 in fines.

A fact I would mention in this case is that this peddler was a "thorn in our side" and we had been after him for over a year; in fact, on his own admission at the time of the trial he stated that he had been carrying on his business for the past 15 years and had never been caught—and this is not a reflection on our organization—as his practice was to jump from neighborhood to neighborhood and from town to town quickly, never visiting the same household twice and allowing lapses of months before revisiting towns that he had

previously worked. We consider this a most important capture and I am candid in saying that he would possibly still be operating were it not for the police assistance which we enlisted. Weights and measures men are only too few and as you can not divide a man into pieces he can not be everywhere at once. This is a tip which I believe all departments can follow with profit—the police will, I believe, be found willing to cooperate (as in the case mentioned) and this procedure casts no reflection on weights and measures officials, as they are the ones who finally make the complaint and prosecute the charges.

Mr. KELLY. Three weeks ago I had a complaint from a young Italian. He told me he had a gallon can of olive oil that he had purchased from a peddler and he had every reason to believe it was short. In making the investigation I found that a truck had driven into town a day or two before and had sold large quantities of olive oil. They had it in cans emblazoned with the coat of arms of Italy and a lot of Italian legends, but there was no name of a manufacturer or packer on it. I measured the oil and found that the cans were over 1 quart short. Now the cans were built in such a manner that the shortage was not easily noticed; some are short and some are long.

I made a trip around the city and found that this man had sold a lot of this oil, at some houses as many as six or seven cans. The point was that he sold it for $1.90 per can, when as a matter of fact a can of good olive oil retails for about $3 in that vicinity. This man has been in once since that time, but unfortunately I missed him by a hair. I have a description of his outfit and I have the police and several Italian dealers on the watch. One man told me that he had bought some olive oil a year ago which was put up in the manner in which they handle this bootleg stuff—the can had a small compartment in it, holding a little more than a pint, and this was filled with olive oil; the rest of the can was filled with water. I came to the conclusion that the man was a reformed bootlegger who had entered upon a less hazardous occupation. I mention this so that you may be on the lookout for any of these fellows if they should happen to start up in your territory.

THE USE OF AUXILIARY AUTOMOBILE TANKS FOR CHECKING GASOLINE DELIVERIES

REMARKS OF THEO. A. SERAPHIN, DISTRICT SUPERVISOR OF WEIGHTS AND MEASURES, CITY AND COUNTY OF PHILADELPHIA, PA.

Mr. President, delegates, and guests: The subject of my paper is "The use of built-in false tanks for checking gasoline deliveries." These tanks are also commonly known as "decoy tanks."

We are all cognizant of the fact that for a number of years considerable thought was given automatic liquid-dispensing devices, such as gasoline pumps and meters, by the various officials of weights and measures throughout the United States, and especially by the National Bureau of Standards, and with the cooperation of the various manufacturers of these devices vast improvements have been made along the lines of weights and measures which make the older types of devices look antiquated as compared with present-day con-

struction. Yet, no matter how accurate or well built a pump or meter may be (and this is applicable as well to all scales, weights, and measures), if the operator of such device desires to cheat he will, beyond any doubt, devise some means to accomplish his purpose, and it is to that type of merchant that we must pay particular attention and make him feel the sting of the law.

To properly detect a dishonest merchant in giving short measure in gasoline requires not only considerable thought but special means and equipment with which to make a purchase so as not to arouse the slightest suspicion on the part of the merchant; otherwise your efforts will be all in vain. Unlike other commodities in which try-out purchases are more or less easily made, gasoline offers quite a problem.

First, you must make your purchase with an automobile.

Second, the automobile must be equipped with a decoy tank especially built for the particular car you are using, making sure, however, that the construction and location of the decoy tank are such that when the merchant is delivering gasoline into this tank there is no outward appearance that would tend to arouse his suspicion as to the presence of such a tank.

There are two types of decoy tanks—one that can be easily lifted or removed from its position and its contents poured into a field standard for measurement, and one that is securely fastened in its position and constructed in a manner that will permit of a thorough drainage, in a practical manner, into a field standard.

Third, it is very important to relocate your driving tank in some position or manner which will cause it to be invisible to the merchant yet readily accessible for filling purposes. This tank should be provided with a drain so as readily to permit withdrawals of gasoline for bringing up the meniscus into the reading gauge of your test measure when necessary.

Fourth, it being a natural tendency for a dishonest person to be constantly on his guard and suspicious of everything, it is necessary, when making a try-out purchase, to use the greatest care in your action and personal appearance so as not to give the operator of the pump cause to suspect that you are an inspector or investigator.

We have often found it necessary in our work to effect some kind of a disguise, and also to make purchases in the evening, accompanied by a lady, in order to ward off any suspicion.

The use of these decoy tanks for making gasoline purchases has been in vogue in the Philadelphia bureau of weights and measures for the past 10 or more years, and our experience with same has been confined entirely to Ford cars. Prior to this year, we used 3 Ford touring cars over the 10-year period, and their construction was such that it was only necessary to remove the cylindrical tank from under the front seat and replace same with two rectangular tanks, each having a capacity of approximately 6½ gallons. The driving tank was securely fastened on the left side, and the decoy tank was placed on the right side and was removable. The filling cap on the decoy tank was placed in the same position as the filling cap on the regular tank. These two tanks were covered with the regular sheet-metal cover, as used on all open-car models a few years ago. The handhole in this cover being directly

over the filling cap of the decoy tank made it impossible for the merchant to observe or detect this tank without raising the cover.

In order to measure the amount received, the decoy tank, which was provided with a pouring spout, was lifted from its position and its contents poured into the field standard. This construction was very simple, very practical, and quite inexpensive to install. This year our department purchased a new Ford car for this particular work, and it was discovered that the 1926 model does not adapt itself to the installation of a decoy tank as readily as the older models for two particular reasons. In the first place, the gasoline tank is located under the cowl where the space is very limited and irregular, making it impossible to locate both the driving tank and the decoy tank in the same space. In the second place, the space under the driver's seat being very shallow, it is impractical for the relocation of the driving tank.

Therefore, to overcome these obstacles, the driving tank was removed from under the cowl, and a decoy tank fastened securely in the same space; a new vacuum-feed driving tank of 17 gallons capacity, was then installed in the rear of the car, similar to various other makes of cars, and while this location is not the most practical, owing to the possibility of detection, yet when making a try-out purchase, it can not be seen from any position the merchant may assume in making his delivery into the decoy tank. This rear location of driving tank has an advantage, however, for it permits three 5-gallon try-out purchases being stored in it from the decoy tank, as compared with one 5-gallon purchase for a tank located under the front seat. Owing to the peculiar and irregular shape of the space under the cowl, the decoy tank had to be made along straight lines so as to simplify its construction, and its over-all dimensions had to be well within the lines of the regular tank so as to facilitate its installation and not interfere with different operating features of the car. The bottom of the tank is well pitched from all four sides toward an outlet so that it will drain thoroughly, irrespective of the grade of the roadway. That part of the tank which is visible through the opening in the top of the cowl, where the filling cap is located, is made identically the same as the regular tank so as not to arouse any suspicion. Drainage of this tank is made possible through a ¾-inch street elbow and a ¾-inch gas cock, which protrude from under the cowl into the space under the hood. This decoy tank is filled in the same manner as the regular driving tank, and after a try-out purchase is made, it is only necessary to drive away to another location, lift up the hood and slip a suitable rubber hose on the end of the gas cock and allow the contents to drain into the field standard, which may rest on the roadway alongside of the car.

Our method of procedure in detecting shortages in gasoline deliveries is as follows: The automobile assigned to this work is manned by two inspectors who have the necessary field standards for testing pumps secreted in the rear of the car. Their work consists of checking up various places that are under suspicion and investigating complaints. When a complaint is made we endeavor to obtain from the complainant as much information as possible regarding the purchase, such as name; address; date; time of day;

name, color, and type of pump; brand of gasoline; name and description of person making the sale; and what discussion, if any, took place with the dealer regarding the purchase. It is important to have as much advance information as possible. It is also important that the try-out purchase be made as soon as possible following a complaint, as it frequently occurs that the complaint is well founded owing to the sale having been made from an empty storage tank. This being the case, making the investigation before the supply is replenished enables you to determine the cause of shortage. All try-out purchases are made by one inspector only, who never appears as an inspector, so that the various dealers do not become suspicious of his position. The second inspector remains away; and if the try-out purchase shows a shortage, this second inspector then appears on the scene and makes a test of the pump so as to determine whether the pump is functioning correctly, whether the liquid level in the storage tank is too low, or whether any other trouble exists. This will help to prove or disprove any deliberate intention on the part of the operator to cheat.

Our department receives many complaints regarding shortage in gasoline deliveries, and our investigations prove that nearly half of them are caused by motorists having too much confidence in the accuracy of their tank gauge or rule. The other causes are divided as follows: Operator deliberately short measuring; pump being operated on an empty tank, knowingly or unknowingly; leaky foot valves; pump out of adjustment; other conditions which necessitate repairs to pump.

In all cases where conditions and the shortage warrant the offender is prosecuted and fined. In our endeavor to stamp out persistent cheating, the oil companies have cooperated whole-heartedly, even to the extent of refusing to sell the offenders gasoline.

If there are any delegates here who are interested in this tank, I will mail them a blue print showing the dimensions if they will give me their names and addresses or address me at the bureau of weights and measures, Philadelphia.

I thank you.

The Acting Chairman. This same subject will be concluded this afternoon.

The conference stands adjourned until 1.45 o'clock p. m.

(Thereupon, at 12.40 o'clock p. m., the conference took a recess until 1.45 o'clock p. m.)

SIXTH SESSION (AFTERNOON OF THURSDAY, MAY 27, 1926)

The conference reassembled at 1.57 o'clock p. m., at the Bureau of Standards, Dr. George K. Burgess, president, in the chair.

THE USE OF AUXILIARY AUTOMOBILE TANKS FOR CHECKING GASOLINE DELIVERIES—Continued

REMARKS OF THOMAS FLAHERTY, SEALER OF WEIGHTS AND MEASURES, CITY AND COUNTY OF SAN FRANCISCO, CALIF.

Mr. Chairman, delegates and visitors, it is with a sense of deep appreciation and gratitude that I accept the invitation to address this conference on the subject of " The use of auxiliary automobile tanks for checking gasoline deliveries," and to describe the marvelous effects resulting therefrom.

The gasoline pump is becoming increasingly important and undoubtedly necessitates a greater amount of attention than any other measuring device, due to the enormously growing popular demand for automobiles, particularly in California where the registration shows that licenses were issued to the owners of 100,000 more cars this year than in the one preceding.

When I assumed the duties of the office of sealer of weights and measures of the city and county of San Francisco in the early part of 1921 numerous complaints regarding short deliveries of gasoline and indicating a deplorable condition, which demanded immediate attention, were constantly pouring in. Fully realizing the magnitude of the task at hand and the responsibility involved, and resolving to meet the same, I called into my office, as a preliminary, the heads of the various oil companies, to whom I explained the situation and my determination to make a most rigid and thorough investigation of every service station in San Francisco. I made it very plain to them that if these reports were confirmed prosecutions would immediately follow which would be pressed to the utmost, and guilty parties would be visited with dire consequences through the imposition of severe penalties and the odium of the attendant publicity.

They expressed deep regret and surprise at the reported conditions and promised their unqualified cooperation in the suppression of any irregularities in this respect. I immediately set in motion my plan to equip a special car by removing turtleback and replacing with camouflaged auxiliary tank, built funnel shaped so that every ounce of gasoline could be withdrawn regardless of the position of car, and placed sufficiently high to enable a 5-gallon standard to be placed underneath in making our tests.

My greatest surprise and pleasure was in finding, after many months of rigid investigation, so little deception practiced in gasoline deliveries, and now, although our vigilance has not slackened, we rarely have a report of short delivery.

The results of these constant and successful investigations were embodied in our annual report and published in the Municipal Record and in other unofficial publications. However, notwithstanding the wide and favorable publicity given our activities in this connection, one of our daily papers, following the footsteps of an eastern journal, and in an effort to spring something new on the west coast, published an article on June 1, 1925, casting reflections on the efficiency of the department of weights and measures and the integrity of the oil companies by giving the public the impression that they were being robbed by operators of gasoline stations. In this article it was claimed that private tests had been made of 30 gasoline stations in various parts of the city by placing in operation a touring car of standard make equipped with a specially designed tank and purchasing 10 gallons of gasoline at each station which was subjected to a test. This gasoline was immediately thereafter stored in an alleged tank established at some mysterious location in San Francisco.

After close questioning by the sealer regarding the methods employed, the reporter for the paper admitted that he had not been able to make a scientific test through lack of proper facilities. But it made good copy of a sort, and that was without a doubt the object of the test. However, when the demoralizing effect of such statements as he had been making through his paper had been explained to him and also the impossibility of making anything like a scientific test without proper equipment, coupled with the further fact that seven experienced and vigilant deputies working out of our office found nothing to justify the conditions such as he described, his paper the following day, June 2, 1925, contained an article confirming the expressed views of the sealer that he believed out of the several hundred stations serving gasoline in San Francisco it would be extremely difficult to find one intentionally giving short measure.

The very deep interest which the public is beginning to manifest in matters of this character constitutes a healthy sign and will ultimately prove to be both healthful and serviceable. There is no factor in our business life more potent than public opinion; consequently when the public is aroused to the point where it demands the minimization of petty fraud, we who are directly associated with this work are heartened and encouraged to believe that a just and proper solution of some of our most vexing problems will be found.

By practical and tactful methods we have obtained the cooperation of the commercial interests in every avenue and have justified a sincere confidence in the minds of the people, clearly expressed in letters and reports from men of high standing in the community, including a highly laudatory indorsement by the grand jury and his honor, the mayor.

In conclusion I desire to thank the members of this conference for their courteous attention and trust that the matters touched upon in this paper will serve a useful purpose in assisting in the protection of the consuming public and the honest dealer in the dispensing of this greatly used commodity.

REMARKS OF M. A. BRIDGE, SEALER OF WEIGHTS AND MEASURES, COLUMBUS, OHIO

Mr. President, ladies, and gentlemen of the conference: While I realize the subject assigned me is a very important one to consider from the standpoint of a sealer of weights and measures and of the general users of gasoline for automobiles and trucks, yet I have endeavored to make my paper a short one.

An old-model Ford touring car is used because the tank under the seat is more easily removed than in any other car. The line connecting the storage tank under the seat is disconnected, the tank taken out and a plug screwed in where the connection is made. A small tank is put in the hood with a line connecting the regular line that was disconnected, and this tank, holding about 2 gallons of gasoline, is used to operate the car.

We secure the services of a police officer on his day off and in plain clothes, one who is not generally known, and with him can ride some lady, which has a tendency to throw off suspicion. We take special care that no one knows what we are doing, especially newspaper reporters, as there is always a scramble to get the news and sometimes they like to get a scoop before we are ready to give it to them. We always write the report ourselves so that no mistake will be made in the publication of our operations. This is much better than taking a chance with an interview with the reporter; besides all the newspapers have the same report and they are very glad to get the story as it always makes interesting reading to those who own automobiles.

There is no special reason why our operations should be kept secret, except that should it be known that we intend to secure samples of gasoline to-morrow for the purpose of finding shortages, no doubt some one would inform an operator or a gasoline company and in a few hours every operator would be advised and all our work would be for naught.

The officer drives up to the station in the ordinary way and asks for 3 or 5 gallons of gasoline. The gasoline is put in the car in the regular manner, the person riding with the officer being a witness to the transaction, but it is advisable for the officer and his partner not to watch the operator too closely. We park our car near the station and get as close as possible without being noticed by the operator, as we are known to all of them, and if they ever would be honest it would be when we were present.

The gasoline is paid for in exact change, the officer drives away and goes down the first alley, following us until we find a convenient place to park. We remove the seat and lift out the tank, remove the plug and drain the gasoline into our testing can, always being sure that every drop has been drained. A record is then and there made, the work being witnessed by four people, all of whom sign the report if a shortage is found. The gasoline just purchased is then put into extra storage tanks which we carry in our own car for that purpose, and thus we continue during the entire day. We never work more than one day at a time, as it would be rather difficult to keep it away from our garage people. There is no question but what the second day following would be a failure.

The first time out we visited 24 stations and made 24 purchases; 19 were short measure from 1 cubic inch to 78 cubic inches, 1 was correct, and 4 were slightly over measure. We had decided prior to our raid that all cases where short measure of 15 cubic inches to the purchase was given would be prosecuted. Seven prosecutions were made involving five different companies, all of whom pleaded guilty and were fined $25 and costs. I might say we always arrest the operator selling the gasoline.

Several months after this we made another raid, and in this we made 20 purchases which resulted in 7 prosecutions, the shortages being as high as 98 cubic inches. The same rule was applied as to the 15 cubic inches short on the purchase. Seven prosecutions were made, all the defendants pleaded guilty, and each was fined $25 and costs. There could hardly be any dispute as to the correctness of the results found, because the tests were witnessed by four persons.

On the basis of this work the total loss to the consumers of gasoline in our city was estimated to be about $549 per day. In arriving at this estimate we took the average shortage found, namely, 4 cubic inches per gallon, and figured the daily consumption as follows: 50,000 passenger cars, using 1½ gallons of gasoline a day, 4,000 trucks at 15 gallons a day, and 2,000 motor cycles at half gallon a day. Thus approximately 136,000 gallons are sold in one day, and with a shortage of 4 cubic inches to each gallon, a total shortage of 544,000 cubic inches, or about 2,390 gallons is arrived at. At a selling price of 23 cents per gallon the daily loss is $549, or over $200,000 per year. This does not include any of our large consumers who purchase their gasoline by the tank car.

We are handicapped by not having or being furnished with the funds to purchase gasoline in the open market. The expenses in this connection are the wages paid the two who ride in the purchase car, amounting to about $16, the difference in the retail and wholesale prices of the gasoline, about 5 cents per gallon, and the operating expenses of the car. The cost of the false tank would normally be about $5. The one I used did not cost anything. All the equipment can be taken out and the car put back in regular running order in 30 minutes. This equipment is held ready for use the next time.

It would not be advisable to use the same car twice, especially if the inspections are made very often, as the Ford touring car would be spotted. We used a Ford roadster on the second trip and we did not have the same officer on the second trip.

We believe much good resulted from these inspections and prosecutions, as the complaints were very materially lessened. If these inspections were to be made every three or four months, the selling of short measures of gasoline would be reduced to a minimum, as no crooked operator would ever know when we were coming. Moreover no gasoline company would keep an operator very long who was arrested and prosecuted for short-measuring customers.

DISCUSSION OF ABOVE PAPERS

The Chairman. The discussion of these papers is now in order.

Mr. Fuller. Mr. Chairman, I would just like to make one suggestion. In making these test purchases, if you purchase 6 or 7 gal-

lons, you will more readily detect the operator who is inclined to be crooked than in case you buy 5 gallons or less. We also found the Ford coupé to be an excellent car to use because the tank in that case is in the rear and it is easier to set up and to lift out the false tank.

TESTING STANDARDS OF MASS (OFFICE STANDARDS AND TEST WEIGHTS)[14]

By A. T. Pienkowsky, *Bureau of Standards*

In general, this paper will be devoted to a discussion of the testing of office standards and of test weights. The method of presentation will be to consider the two classes together and to make special mention of differences in the required conditions, apparatus, and technic where such differences are considered of sufficient importance to require it.

PRELIMINARY CONSIDERATIONS

General conditions, etc.—When both office standards and test weights are to be tested by a department, the same room will, in general, be used for both classes of testing. Therefore, this room and its general arrangements must be good enough for the better grade of work that is to be done. While it is true that the less accurate testing can be satisfactorily done under somewhat less satisfactory conditions than would be necessary for the more accurate work, nevertheless the effects of faulty conditions are so extremely irregular that it is impossible to draw sharp limits, and therefore it will be wise to obtain as good conditions as possible. A number of suggestions will be given, but it is absolutely essential that the man who does the testing should assume responsibility for the conditions being good enough. The only practicable way to do this is to follow the suggestions given later in this paper as to checking the reliability of the balance, and as to repeating some tests or using some other form of check on the accuracy of the results.

Under the heading of "General conditions" there are two main considerations—stability and temperature considerations.

Fortunately everyone will notice serious vibrations and try to avoid them. When it is impossible to obtain a room that is free from serious vibrations, the effects can be reduced or eliminated by suitable mounting of the balances but the arrangements needed vary so much with local circumstances that it is hardly worth while trying to discuss the matter in general terms.

In checking the office standards, especially, it is seldom advisable to work on balances that show any evidence of vibration, or that shift their zero point when any part of the table or bench is subjected to any load likely to be put on it. The latter is especially

[14] Author's note: Since this paper is printed for reference instead of being read at the conference, it has been enlarged to include items that would naturally have come up in the discussion; it has also been arranged in a manner better suited to reference than to oral delivery and is therefore somewhat longer than the author originally intended.

important when balances are being read to a small fraction of a scale division, as may be necessary in some cases. Very heavy benches attached to the wall may be advisable if the walls are massive and free from vibrations. It is often worth while to build heavy piers, such as those of brick or stone, free from the floor and resting on large slabs embedded in sand. But, as said before, different circumstances require such different treatments that if any serious difficulty is encountered it is best to seek advice on that particular situation, and it may be necessary to experiment in order to find the best solution.

The other important element of stability is freedom from tilting or tipping of the surface on which the balance rests. The importance of having a balance accurately level is generally overstated, and I need not discuss it; but the amount of tilting or tipping which may take place in weak wall shelves or in tables set out in the middle of a room is likely to be underestimated. Contrary to what one is likely to think, the tipping of a balance while one is weighing makes the greatest effect on balances that are the least sensitive. Therefore, do not think that this possible tipping concerns only the extremely sensitive balances. It often is just as important or even more important to have very stable supports for the less sensitive balances if these balances are being read very closely.

Temperature must be approximately uniform in the vicinity of the balance during a test, but tenths of a degree are of no significance in this work. As an example of extremes that need to be avoided, it may be mentioned that there should not be a hot radiator within a few feet of the balance. Similarly, direct sunshine should not be allowed to fall on the balance, especially from one side. On the other hand, the heat from a person's body will not ordinarily make trouble in this work, though in checking office standards it is well not to have the hands too near the beam, and even in testing test weights it is well not to touch the beam.

Before checking office standards it is preferable to have both these and the primary standards close to the balance for some hours before the tests are made, in order that they may all be at the same temperature. In checking test weights much less care is necessary in this regard, but in cold weather they should not be tested immediately after bringing them in from out of doors, nor immediately after taking them from near a window. Such things as these must be considered in arranging a room or in planning the times and methods of testing.

The temperature should be reasonably constant not only during a test, but for some time before the testing is done. If a room gets very cold during the night, the first hour or two in the morning may be the worst part of the day in which to do testing. In an office building with any sort of up-to-date heating equipment, there is not likely to be much trouble from this source, but in shops or factories it may be very necessary to consider this source of possible trouble in planning or selecting a room or in prescribing times or conditions under which testing may be done.

It is well to remember that the larger the weights and the more highly polished the surface, the more will the weights lag behind the surrounding air in temperature, so that the larger weights must

be kept in air at the proper temperature for a longer time than is necessary with the very small weights.

As already stated, changes of tenths of a degree need seldom if ever be considered, but if the temperature has been changing for an hour or two at the rate of several degrees per hour before a test, trouble may result. In some cases good results might be obtained. but if there is no previous experience to prove that this is likely to be the case, either the testing should be postponed until conditions are better, or special attention should be paid to checking the accuracy obtained, by repeating some of the tests after the temperature has been more nearly constant for some time.

Many temperature conditions affect the balance by setting up air currents. Other sources of air currents must also be guarded against. For example, a balance should be set near a corner rather than between a door and a window. Strong air currents must be avoided even if the balance has a case that is closed during the weighing, because no ordinary cases are air-tight. Another source of air currents to be guarded against is the breath of the person who is doing the weighing.

The effects of poor stability or poor temperature conditions are so irregular and uncertain that it is especially important in these matters to allow what the engineers call a factor of safety; that is, try to have them a little better than seems really necessary.

Equipment.—Such equipment as suitable standards and balances are listed in the "Manual of Inspection and Information for Weights and Measures Officials," Bureau of Standards Handbook No. 1, and need not be repeated here in detail. Certain facts should be noted, however.

For State departments of weights and measures both primary and office standards of mass are needed, the former conforming to Bureau of Standards specifications for class A weights and the latter to those for class B weights.

Theoretically it may seem feasible not to provide class B standards and to use only the primary standards. Under some conditions this might be true, for instance, if only one, or, perhaps, a very few sets of test weights were to be tested per year. But practically such a condition seldom exists, and actual experience has shown that the lack of office standards often results in excessive wear on the primary standards.

So long as a State has only a very small amount of testing work to do it may be proper to purchase class A primary standards and to omit the office standards. But from the discussion below on handling standards it should be evident that when a State has a reasonable amount of work to do, and when money for both primary and office standards is not available a safer method is to purchase a good set of class B office standards and have them tested by the bureau more often than would be necessary with class A standards when properly cared for. Then when class A primary standards can be purchased there will be on hand equipment that will allow these primary standards to be properly preserved.

Since the tolerances on class A and class B weights are the same, it is necessary to have the actual corrections for the class A

primary standards in order to test the office standards with a sufficient degree of accuracy.

The published list of balances for weights and measures departments of the States has specified only one grade of balance for each capacity, and has specified for each such a sensitiveness that each balance can be used for testing the office standards by reading it more closely than is necessary in checking the test weights.

The recommended list of balances, as published in the handbook for weights and measures officials is as follows:

Capacity	Sensibility reciprocal
50 pounds or 25 kg	1 grain or 60 mg
5 pounds or 2 kg	0.02 grain or 1 mg
4 ounces or 100 g	0.01 grain or 0.5 mg
¼ ounce or 5 g	0.001 grain or 0.05 mg

A study of this makes it at once evident that the 5-pound and 4-ounce balance overlap to a large extent. This gives two balances for the region in which there are usually the largest number of weights to be tested—an arrangement that has several advantages. The two smallest balances also overlap somewhat, so that if difficulty is found in procuring a satisfactory one-fourth-ounce or 5-gram balance, it may sometimes be advisable to procure an assay balance even if it has a capacity of only 1 or 2 grams (about one-sixteenth ounce).

It is convenient to have a rider on all except the largest balance, and to have the balances so made that the zero of the rider scale is directly over the central knife-edge and the riders can be used on both sides of the beam. Riders in either metric units or in grains may be used on any balance arranged for use with a rider. If the rider is in grains and if the rider scale is so graduated and so numbered that hundredths of the value of the rider can readily be obtained on each side of the central knife-edge, as is usual, the rider for the 5-pound balance would preferably be of 1 grain, in which case hundredths of a grain will be indicated. The rider for the 4-ounce balance of similar construction would be of 0.1 grain, thus indicating hundredths and thousandths of a grain. A corresponding rider for the smallest balance would be one of 0.01 grain, indicating thousandths and ten-thousandths of a grain; but these very small riders are very frail, although frequently used on assay balances, and unless close attention needs to be given to the very small office standards, it will be well to have a rider of 0.1 grain on the smallest balance also, in which case it will give the same indications as on the 4-ounce balance mentioned.

In the metric system the corresponding riders would be, respectively: 100 milligrams, indicating down to 1 milligram; 10 milligrams indicating milligrams and tenths of a milligram; and either the same as the latter or 1 milligram indicating tenths and hundredths of a milligram.

If such riders are not furnished when the balance is purchased, it will often be worth while to purchase them, care being taken to see that they are of the proper shape to fit the particular balance on which they are to be used.

Metric riders may be used in testing avoirdupois weights by having a table of the tolerances converted into metric units, and vice versa.

Two different riders for the same balance are seldom advisable because of the trouble of changing, and the danger of confusion.

When balances are needed only for checking test weights, it will not be necessary to secure all four of the balances mentioned above. On the contrary, in State offices in which very large numbers of test weights must be checked, it may be advisable to have extra balances specially suited to this work, and reserved for this work alone. It is impossible to discuss such variations in a general paper of this sort, and advice in such cases should be based on a full knowledge of a large number of details.

May I interject two practical suggestions in regard to buying balances. (1) Do not specify that the two arms of the beam must be equal to an extremely high degree of accuracy. Plan on eliminating errors due to slight inequality of arms by the short substitution method of weighing outlined a little later in this paper. This may save much in cost or in other troubles of buying. (2) However, always specify that the balance must be reliable; that is, that it must repeat its results within the required degree of accuracy when repeatedly arrested and released with any proper load on the scale pans, or when the weights on the pans are removed and replaced, or are placed slightly away from the center of the scale pans. It is not intended by this to require that the zero point and the sensitiveness be constant from day to day, nor to require a constant sensitiveness for different loads. Reliability does require, however, that certain qualities of construction be present without which a balance is useless for accurate work.

The reliability required is a function of the accuracy to which the weights must be tested, and this will be considered next. It should be noted, however, that these double-purpose balances will be better balances than are absolutely necessary for checking test weights; also that to maintain their greater accuracy they must be used with greater care than might be necessary for balances designed for the lower precision work.

Precision needed.—The precision needed is dependent upon the tolerances for the weights to be tested, but these values can not be used directly and analysis is necessary to express the necessary precision numerically. Thus, supposing the tolerance on a weight to be 1 grain, there must be considered some such question as the following: "Must the balance be able to show whether the error of the weight is 0.001 grain over the tolerance, or is it enough to be sure whether the error of the weight is one-half grain over the tolerance?" Speaking generally, within what degree of precision must adherence or nonadherence to the tolerance be determined?

Now, when a balance indicates that an error is just equal to the tolerance you can not possibly know that it is not an infinitely small amount over the tolerance, because no balance is infinitely sensitive. Moreover, the amount by which the error might be over the tolerance depends entirely on the sensitiveness of the balance. Therefore, the safe rule is to condemn office standards and test weights unless the balance gives at least some indication that the error is less than the tolerance. If this rule is adhered to, it will result that the less sensitive the balance is the more accurate these weights must be kept.

With these facts in mind it seems reasonable to procure balances which will be capable of disclosing errors equal to one-fifth (or possibly to one-tenth) of the tolerances of the weights which are to be tested, just as the tolerances for class B standards are one-fifth of the tolerances for class C weights.

It seems that one very important point in relation to the application of tolerances to the inspector's standards and to the weights used in trade should be emphasized here since there is a fundamental difference to be observed. In respect to your own weights you should reject them as suggested above, unless you are sure they are right, while in the case of trade weights you should not condemn them unless you are sure they are wrong.

Choice of method.—In the selection of a method, the work under consideration in this paper is about on the dividing line. For somewhat more accurate work there would practically be no chance of doing it satisfactorily except by what may be called transposition or substitution methods of weighing. If the work were somewhat less accurate, an office certainly should be equipped with a balance that could be used by the ordinary "direct" method of weighing, in which the weight to be tested is placed on one scale pan and the standard on the other. Moreover, while the very smallest weights can almost always be tested by the "direct" method of weighing, the larger weights can very rarely be so tested.

To be safe for use by the direct weighing method, a balance must be tested to show that the two arms of the beam are near enough equal. A single test of this is not enough, except, perhaps, in the case of the smallest balance listed, because in many balances the relative lengths of the arms of the beam will change with use, with age, or even with changes of temperature.

The full test for equality of arms of the beam is not needed, but it will be sufficient to note whether the same results are obtained by the direct weighing method in testing a weight first on one scale pan and then on the other. This must be tried at large loads as well as at small loads, because the error is proportional to the load. Also, the apparent difference between the weight and the standard must be noted in both cases, because a mere tolerence test would not be precise enough for this purpose. When the same result is obtained on both scale pans the arms of the beam are equal.

So few balances (except the smallest one listed) are likely to allow the direct-weighing method in testing office standards, and so many will require a better method even in checking test weights, that nothing further need be said about the direct weighing method, especially as it is so well known.

The transposition method of weighing is very good for extremely precise weighing, but need not be considered here, as it is more complicated than is needed.

Fortunately, a simple substitution method can be used very easily, and, although it is simple and easy, it eliminates all doubt about the effect of inequality of the arms of the balance beam, and therefore avoids all need for the occasional testing of this feature.

Handling standards.—In using the primary standards it is especially important to give proper attention to the manner of handling them. Perhaps a little practical experience will best show this need.

The Bureau of Standards many years ago sent out some inspectors to do testing in stores and markets. Gold-plated class A weights were used for the psychological effect. In this psychological effect they were very successful, but, as had been expected, they came back after a short period of use much more inaccurate than if they had been bare brass, although they were handled by men accustomed to taking care of good weights. In other words, class A weights must be handled with special care or they will be very unsatisfactory so far as continued accuracy is concerned.

Of course, we would like weights that can be slid around, dropped, and bumped against things without hurting them; but no one has yet discovered such weights, and we might as well face the facts. According to Doctor Stratton's description, a gold-plated weight is a very thin shell of very soft gold filled with something to give sufficient weight and hold the shell in place. When proper lifters are used this shell will stand the pressure of lifting and handling the weight because it is backed up by the metal underneath, but in so far as resistance to rubbing, scraping, or cutting is concerned, this shell is as fragile as an egg shell and far thinner.

A soft, clean glove would be an almost ideal lifter for the larger weights except for the fact that one is almost certain to handle other things with the glove on, so that it soon gets full of grit and dirt. Bare hands have the objection that they always leave more or less grease or perspiration on the weight, and this has a strong tendency to corrode the base metal in spite of the gold plating.

A careful appreciation of these peculiarities of gold-plated weights is a big help toward getting the habit of using practical and reasonable precautions. The inevitable penalty for not using the proper kind of care is loss of accuracy and heavy bills for repairs or for new standards. This is the greater pity because improper use does not really save much time; it is chiefly the result of mental carelessness and laziness, both of which should be quite foreign to the weights and measures inspector.

OCCASIONAL

Of the things that demand occasional attention, the one most commonly recognized is the need of having the standards tested. In this connection it may be well at this time to call attention to the fact that some State officers are not returning their primary standards for retest by the Bureau of Standards as often as this should be done. Without such periodic retesting it is impossible to be sure of the accuracy of the State standards. The more the State standards have been used the more need for having them retested.

As a little temporary help for anyone who may be doubtful of the accuracy of his standards of any grade, it may be worth while noting that there is really much added safety to be had by the simple checking of these standards against each other. I mean comparing the two 10-pound standards with each other, comparing the 5-pound standard with the sum of the two twos and the one, and making up other similar combinations until all of the weights have been included in some group. If standards have become inaccurate, there is very little chance that both 10-pound weights will have developed just

the same error, or that the error of the 5-pound weight will just equal the sum of the errors of the smaller weights used to make up 5 pounds. Therefore this checking of the standards against each other is almost sure to disclose the most serious errors, though it does not readily show just which weight is in error. Neither does it show definitely whether the set as a whole has been getting lighter by wear or heavier by tarnishing or rust. Of course, in doing this a person must not forget to add up the tolerances for all of the weights that are put together on one scale pan; otherwise he may think his standards are not so good as they really are.

Another item for occasional attention—one that applies both to the balance itself and to the conditions under which it is used—may be called a reliability test.

It is quite possible for a balance to be very sensitive, to look very good, and yet to give variable results, some of which must be incorrect. No maker's guarantee can prove that a knife-edge has not been damaged, or become dirty since the balance was put into use; and no test at the Bureau of Standards can guarantee that a balance will give correct results if it is used under improper conditions.

It is extremely easy, by putting a small weight on one scale pan, to see whether the balance is sensitive enough. The substitution method of weighing eliminates all error from possible inequality in the arms of the beam, except as to changes in length that take place during a weighing. Therefore, the only remaining things to be tested for are those producing changes during a weighing, and the simplest test for these things is to repeat tests and determine whether the same result is always obtained. Under some circumstances special check weighings may be used to advantage, such as testing several weights and then testing the sum of these weights against another standard. Such special checking can be made very complicated, and may be very valuable, indeed, but for the present we will consider only the simple repetition of some of the tests.

If a balance has not been used recently, it is a good practice to arrest and release it several times when first checking the zero point. Then if one or two weights are very close to the tolerance, so that they must be tested with especial care, it is a good idea to set them aside after a careful test and test them again later. In this way you make double use of the time that is required, and have the test as to reliability with very little real expenditure of time.

When there is danger that the temperature of the room may have been changing too rapidly, or that the weights being tested are not near enough to the temperature of the room, it is well to allow the balance to swing several times and note whether it swings perfectly regularly, as it should. But this will not always show some faults, and the final check must be to retest certain of the weights after it is known that the temperature conditions are much better.

Similarly a number of other possible sources of error may be checked by repetitions under better or at least under different conditions. Some of these will be in the nature of preliminary tests merely to prove that certain conditions or certain balances are satisfactory; but some occasions for such tests are very likely to arise occasionally, and as balances become older there will always be the need for occasionally giving them such tests.

This matter of testing for reliability is worth a great deal of emphasis, and it is far too often neglected. Perhaps it may be summed up by saying that the person who never repeats tests (or does not have some other way of checking up) is as bad as the bookkeeper who never balances his books. On a similar basis of comparison the officer who does not have his primary standards retested is as bad as the firm that does not know the value of the property it owns.

MAKING THE TEST

Zero point.—As suggested heretofore, the method which will be described will be the method of substitution weighing. The first thing to be done is to put the standard on one scale pan, counterpoise it with some suitable material on the other pan, and "balance up" the two. This is equivalent to balancing up or checking the zero point in the ordinary direct method of weighing. Do not forget that you do not need first to balance up without weights on the balance. The most convenient material for counterpoising is naturally a set of weights, which may be called counterpoising weights. These do not need to be accurate because their values are not used, but if they are too inaccurate they make it difficult to get a satisfactory zero point. Weights that are to be tested later can be used, or, indeed, almost any kind of material the weight of which is not likely to change during the weighing can be employed; but in the long run it pays to use some set of reasonably accurate weights for this purpose. Even with such weights it may be necessary sometimes to use a little small material or some small weights in order to get a convenient zero point.

Probably the objection most likely to be raised to the substitution method of weighing is that it is necessary to make an accurate adjustment of the zero every time the standard is changed. It will be seen a little later on that to adjust the balance to zero is not at all necessary. Therefore, the additional time required is not so much as may be thought by one who has never studied the shorter methods of doing this work. The necessity of accurately balancing at zero is avoided by using as the zero point whatever rest point can be easily obtained when the standard is being counterpoised.

Determining the rest point.—With balances such as are listed above it will seldom be necessary to read the index scale closer than the nearest division, and the rest point may generally be taken by rough calculation or by eye estimation as the mid-point between the extremes to which the pointer swings. It is best to let the beam swing more than once, and the first estimate of the rest point can then be checked by one or more succeeding swings.

When it is necessary to make a close estimation of the rest point, it is often found that the "falling off" or "dying down" of the swing must be taken into account. The simplest way to do this is to use three consecutive "turning points," which are the extreme points to which the pointer swings before it starts back again. For example, suppose the pointer swings to the fifth division on the left, then to the eighth division on the right and then back to the fourth division on the left. The point half way between the fifth and fourth divisions on the left is considered the left end of the

swing and the mid-point between this and the eighth division on the right is then the true rest point. This method is practicable so long as it can be done by a sort of eye estimation; but just as soon as actual calculations are needed, the best plan is to go over at once to the accurate method for computing rest points as given below.

When the rest point really must be known closer than about one-half of a division, and the "falling off" is relatively large, as in the example above, it is best actually to calculate the rest point arithmetically. To do this most simply the index scale should be numbered consecutively from left to right. It is often convenient to call the middle of the scale 10 or 100 or some other convenient number, and it is not at all necessary for these numbers to go down to zero, since there are no complications whatever in using such index scales as one from 5 to 15 or from 60 to 140. The important requirement is that the scale should be so numbered that it can be read easily and without liability of mistake.

With scales so numbered there are no subtractions and no plus or minus signs. If there is no appreciable "falling off" between successive readings on the same side, the rest point is simply the numerical average of the extreme right and left hand readings. In the example of "falling off" given above, with a scale whose center was numbered 10, the readings of the turning points would have been 5, 18, and 6. The average left-hand reading would then be 5.5, and the average of this and 18 would be $\frac{5.5+18}{2}$, which is 11.75. But since the scale can not be read closer than 0.1 division this would be rounded off to 11.8.

This accurate calculation of rest points does not involve any further calculations. In the regular testing it will only be necessary to note whether other rest points are more or less than this amount. The calculations described in various bureau publications that deal with weighing methods would be needed only when one wishes to get the actual amount of the error of a weight.

In using balances that "fall off" rapidly, or that are not amply sensitive, great care must be exercised at two points: First, such balances are likely to be less reliable as well as less sensitive, and therefore the repeating of tests or other methods of checking the results must be given greater attention; and, second, computed rest points and other computed values must not be carried out beyond the precision warranted by one's ability to read the scale.

Which scale pan to use.—Either scale pan may be used for the standard. However, if rest points are to be calculated numerically, and in some other cases, it is best to use that scale pan that will give larger readings on the index scale when a heavier weight is placed on this pan. To secure this arrangement the testing must be done on the left-hand scale pan of balances of the more common type, in which the pointer extends downward; but it would be necessary to use the right-hand pan of the "inverted" type of balance, which is rather common in assay balances.

Allowing for the corrections for the standards.—An important difference between testing the office standards and testing the test weights is the need of allowing for the corrections for the primary standards. An examination of the corrections certified by the Bu-

reau of Standards will probably show that some of the corrections are so small that they can safely be neglected. This is generally true of any correction that is less than one-fifth of the tolerance of the weight being tested.

Where the corrections are large enough to be considered the allowance is easily made when the standard is put on the balance. If the correction is minus (—) the standard is too light; therefore, a weight equal to the correction is put on with the standard. This "correction weight" becomes practically a part of the standard and is put on and taken off with the standard just as if it were a part of it. The weight being tested is then compared with what is practically a perfect standard and no further calculations or considerations are needed. If the correction for the standard is positive (+), the "correction weight" is placed on the other scale pan. It is put on when the standard is put on, and taken off when the standard is removed, just as in the other case. Extra care should be used in this case, however, for fear of forgetting to add or remove the "correction weight" at the proper time.

When suitable riders are available they may be used very conveniently as "correction weights," especially in testing the smaller office standards. If such riders are not available it will be necessary to use small weights down to 0.01 grain in order to test office standards down to 1 ounce. Weights small enough to use in testing smaller office standards are seldom found practical, so that for smaller office standards it is practically necessary to use riders or else to use the "Precise-deflection method" discussed later.

A rider is used exactly the same as weights on the scale pan, being put on at the proper place when the primary standard is put on, and removed when that standard is removed.[a] Since the rider is removed with the primary standard it is free to be used for a tolerance weight after the office standard has been substituted for the primary standard.

By this simple method of using a "correction weight" the corrections for the primary standards are taken care of automatically.

In checking test weights against office standards, the possible correction for the office standards need be given no consideration except when the error of a test weight is very near the limit. In such cases there should be applied a safety rule similar to the one discussed under "Accuracy needed." The weight should be considered out of tolerance if it would be out on the supposition that the standard had its maximum possible error, and was also light if the test weight is light, or too heavy if the test weight is too heavy.

Testing for tolerance.—Since both office standards and test weights are tested for tolerance, merely—not to see just how much the error is—all that is necessary is to see whether the error is more or less than the tolerance. Therefore, when the weight to be tested is put on the scale pan, a weight equal to the tolerance or a suitable rider is the only other weight needed. If the weight under test is light, the tolerance weight is put on with this weight; and if the two together are heavier than the standard, the weight under test is evidently within the tolerance. Conversely, if the weight being

[a] This applies to a balance having a rider scale with the zero over the central knife-edge.

tested is heavier than the standard, the tolerance weight is put on the other side of the balance; and if this tolerance weight is more than enough to bring the rest point back to the zero point, the weight under test is within the tolerance.

Outline of actual test.—As already said, the first thing to do is to put the standard on one scale pan (and the correction weight, if this is used, on the same pan or on the opposite pan according to whether the standard is light or heavy), balance it approximately with some counterpoise weights or other material, and note the rest point. Now take off the standard (nothing more, except the correction weight, when this is used), and substitute for it the weight to be tested. Then put on the "light" side a weight equal to the tolerance to be allowed on the weight under test. If this is more than enough to bring the pointer back to the "zero," the weight being tested is within tolerance. If the tolerance weight fails to do this, then the weight being tested is outside the tolerance.

Use of deflections for tolerance.—When many weights of the same denomination are to be tested, the work can be still further shortened if the balance is not too sensitive. This is done by using, instead of the tolerance weight, the amount by which the pointer is deflected by a weight equal to the tolerance. This must be determined for each load at which it will be used, because the sensitiveness of the balance may be different with different loads in the pans. After finding how much deflection of the rest point is caused by a weight equal to the tolerance, it is merely necessary, after putting on the weight to be tested, to note whether the rest point is too far from the "zero" determined as above with the standard on. This is a very rapid method when the weights being tested are either very accurate or very inaccurate, but it should not be relied on when weights are close to the tolerance. In that case the tolerance weight should be used at the time the weight under test is on the balance.

Use of riders.—When a balance has a rider, such as has been recommended above, the rider is extremely useful both as a tolerance weight and as a correction weight.

In handling a rider there is one safety rule that is worth special emphasis. This is always to bring the beam back to its middle position before attempting to move the rider.

RECORDING

In the testing as outlined here there is no need for detailed recording of observations. One matter of recording may be mentioned, however. As a matter of safety, if for no other reason, it is always best to keep a record card or sheet for each set tested, so that as the individual weights are tested they can be checked off. Such a record should, of course, contain also the date, the name of the one who did the testing, and any other data that are known to be of importance.

SUMMARY

Although any summary must omit some things of importance, the following may be useful in coordinating and helping to remember the most important or most needed facts.

Piers or benches should be very stable; balances near an inner rather than an outer wall. Temperatures of all weights, balance, and surroundings moderately uniform, and general temperature moderately constant for some time before the test.

Both primary and office standards provided in all States doing even a moderate amount of work; and as a rule four high grade balances.

Standards and balances handled gently and proper lifters used.

The accuracy of weights under test to be determined within about one-fifth to one-tenth of the tolerances, and rejected unless the balance gives positive indication that the errors are less than the tolerances.

Standards retested at proper intervals. Balances and "conditions" to be checked occasionally for "reliability" by repetition of tests.

Testing done as a rule by simplest possible substitution method. Tedious zero adjustment to be avoided by using as zero whatever rest point can easily be obtained when counterbalancing the standard. Corrections for primary standards to be compensated for, when necessary, by "correction weights." Accuracy of weights under test to be determined by "tolerance weights." The use of extremely small weights avoided by the use of suitable riders, where possible.

PRECISE DEFLECTION METHOD

With proper equipment this method will not be needed in the ordinary testing of either office standards or test weights, but it is mentioned in previous parts of this paper, and is given here merely to make the paper complete.

The weighing consists of three steps. In each one, for precise work, the rest point is actually computed as indicated above under "Determining the rest point" for very close determinations of the rest point. These three steps are as follows:

A. Compute the "zero" (with the standard on the scale pan, as usual, but without using any correction weight).

B. Compute the rest point with the weight under test substituted for the standard.

C. Without making any other change, add to the "light" side of the balance a weight which we will call w, and which is large enough to bring the rest point back at least to that found in A, and preferably much beyond that point if there is room enough. Then compute the rest point again.

Divide the difference between the rest points found in A and B by the difference between the rest points found in B and C, and then multiply w by this quotient. This product will be the difference between the standard and the weight under test. With the scale numbered as indicated, the weight under test is heavier than the standard if the rest point under B is larger than that under A, and vice versa. The allowance for the correction for the standard can then be made by properly combining this correction with the difference found. The result will be the actual amount by which the weight under test is too heavy or too light.

The CHAIRMAN. The Secretary of Commerce needs no introduction.

ADDRESS BY THE SECRETARY OF COMMERCE, HON. HERBERT HOOVER

Gentlemen of the conference: I have had the privilege of greeting this conference for, I think, six years and it is indeed a pleasure for me to welcome you here again to-day. It means that the cooperation between the Federal and State organizations is becoming steadily stronger because more and more technical bodies join here with you. I do not need to repeat to you the assurance that I have been expressing for the last five years as to the high importance of your work and the high value we place on these conferences. One of the great values that I place upon them is almost fundamental in our whole form of government; that is, when we established a Federal form of government based upon the local responsibility of our people to govern themselves, we in effect also set up 48 laboratories in the science of government. The accomplishments of each one of these States in all the various segments of social and political action has enabled this Nation to make more progress in problems of public relations to public welfare than any other nation in the world. It becomes of first importance to us to preserve those laboratories of experimentation and to defend them from invasion and extinction by centralization of government. So I am one of those who are strong for cooperation between State and Federal bodies interested in common problems and I am opposed to attempts at solution by extension of Federal control and bureaucracy of such activities as those you represent.

Now weights and measures, of course, are not a new problem. In fact, weights and measures go clear back to the Mosaic code, and I have no doubt if you will investigate you will find it in use in civilizations earlier than that. References to them appear from the first largely as a question of morals. The injunctions in the Mosaic code are largely of the moral order and falsifications are denominated as a first-class sin. To-day also a very large segment of the work in administration of weights and measures is of the police type—at least this part of the job has precedents extending back from 4,000 to 10,000 years, and the rules which we have at the present time in those particulars are not very far different from those you can find most anywhere during that time.

It would also appear that there are other segments of the weights and measures problems which even the ancients had to meet. One of them has been to secure a uniformity in weights and measures. Another one of the problems which is by no means new is the attempt to secure simplification in weights and measures; and one of the things which the world has also had to struggle with ever since the beginning of civilization is the development of new weights and measures to enable them to competently handle new things discovered.

Some people rather feel that "standardization" is a term which has become very recently used, that it is a new term or at least a new idea. As a matter of fact, weights and measures themselves are the first appearance of standardization in civilization. They are, undoubtedly, both from an historical and the present point of view the most important of all the "standardizations" in civilization. I imagine that it will continue to be so just so long as civilization con-

tinues to develop because every time that we discover something new, some new force, some new development in science, we are compelled to develop some way to weigh and measure it and determine its value or its motion. So you are never going to get to a finality in your job.

There is also the continuing job for statesmanship in constantly enlarging uniformity in weights and measures and in the adoption of more simple systems in addition to the continuous job in the development of new weights and measures when new forces are discovered in nature. And in all these things we in the United States must have cooperation in all of our 48 States, but it does not necessarily imply that we should centralize that authority. As a matter of fact, we would injure the whole process of development if we did that.

Now, there have loomed up in recent years still further problems related to these questions which I have discussed on other occasions. Some of them are not quite weights and measures as we denominate those terms, but they are very closely related to them. One is the problem of securing more uniformity in the dimensions of articles in order that both the buyer and the seller may simplify their relations and gain in economy. Also it helps to produce actual economies in the production and distribution of articles because we are able to produce them en masse if we have standards; that is, I believe, the newest phase of your work. It has come into the public mind during the last 10 years. It is almost as important to the consumer to reduce the number of sizes of milk bottles that are currently in use from 50 down to 6 or 7 as it is important to him that the bottles used do carry the amount of contents which they purport. It is not only of importance to him as a method by which he knows that he is getting right treatment, but it is important in eliminating waste in the manufacture and distribution of milk. There are a thousand avenues of that character, a constantly enlarging field in your work and your profession.

One could go into a good deal of oratory and discussion as to the importance of weights and measures in both the older and the newer fields, in the whole of our modern civilization, in the whole of our commercial transactions, for the whole of scientific research and discovery revolves on the use of weights and measures of one kind or another. All these things must be developed with a high degree of intelligence. In fact, I doubt if there is any field in which our intelligence can be better expended than in this same field of weights and measures in all of its implications, because it comes to a very large issue in its final results. It is a part of the issue of eliminating waste in motion and waste in material. Some day that question of waste in this sense will loom up as one of the great problems of civilization.

If we are to maintain the high standards of living for increasing populations we can only do so by further and further elimination of this waste in motion and material. Any way that we can through such efforts as these arrive at simpler action, more uniform action, more accurate action, weighs enormously in that scale. The only reason why Malthus failed in his prophesy of a century ago—that the time was rapidly coming in his opinion when the increase in population in its pressure on subsistence would so lower the stand-

ards of living that population would find its limit in starvation—that prophesy as you will recall loomed large in the social economic world of our great-great-grandfathers—the only reason that he failed in that prophesy was the scientific discoveries that have been made in the world since that time by which the productivity of man has been enormously increased, by which we have reduced the waste in motion and materials. The result has been that in spite of increased, enormously increased, populations, we have the paradox of higher standards of living than were dreamed of by Malthus. I presume in the United States the average standard of living is as high at least as that of the poor relations of the royalties in Malthus's time. So, if we are to contemplate doubling the population of the United States in another 50 or 75 years and if we are to contemplate the maintenance and the increase in our standards of living parallel with that increase in population we have got to make a series of scientific discoveries and a long series of perfections in this waste of motion and material. Otherwise Mr. Malthus will yet have his prophesy come true. We must look to scientific research (in that I include the work of the type which you carry on in the prosecution and extension of uniformity and character of weights and measures). Therefore, I would like to express to you that your profession is a real profession—you have a real service to perform not only in your daily duties, but in the development of an art and a science. I wish to welcome you again here in Washington in the building up of cooperation between yourselves and the Federal institutions that are given to that same purpose.

Thank you.

REGULATING THE SALE OF EGGS IN OREGON

By William A. Dalziel, *Deputy Sealer of Weights and Measures, State of Oregon*

Gentlemen, it is with pleasure that I address you, my fellow workers, in this Nineteenth National Conference, and bring to you greetings of good fellowship from our far western State. I feel quite elated at having been again chosen to represent Oregon at the conference, and trust that the subject which has been assigned to me will be presented in such a manner that the information may be of some assistance to those representing other States which may be contemplating laws of this nature.

In order to promote the development of the Oregon egg industry, to prohibit the sale of eggs unfit for human food, to prevent deception in the sale of eggs, to protect the consuming public in the matter of quality and weight of eggs, and to encourage a greater consumption thereof by regulating and standardizing the grading, classification, and labeling of all eggs displayed for sale, there was enacted by the people of the State of Oregon at the 1925 session of the State legislature an act commonly known as the Oregon egg law.

The enforcement of this law in Oregon is conducted by the dairy and food department, J. D. Mickle, commissioner, with offices in the Worcester Building, Portland, Oreg.

The section of our law relating to the several grades for eggs, which is the section of particular interest to weights and measures officials, reads as follows:

SEC. 4. It shall be unlawful for any person, firm, or corporation to sell or offer or expose for sale any eggs intended for human consumption without notifying by suitable sign or label the person or persons purchasing or intending to purchase the same of the exact grade or quality and the size or weight of such eggs, according to the grades prescribed herewith:

(*a*) A fresh egg is an egg of recent production, clean, full, with "fixed air space" of not more than three-eighths of an inch in depth, sweet, strong of body and unimpaired in quality; the albumen must not appear watery. A larger air space with a movable lower line indicates a stale egg, or one that is becoming weak and watery.

(*b*) A fresh standard egg is a fresh egg, as defined in paragraph (*a*), weighing not less than one and five-sixths ounces.

(*c*) A fresh medium egg is a fresh egg weighing not less than one and seven-twelfths ounces.

(*d*) A fresh undersized egg is any fresh egg weighing less than one and seven-twelfths ounces.

(*e*) All standard eggs, medium eggs, and undersized eggs shall be packed separately and the grade plainly marked on the end of the case, showing the particular grade of eggs in the case.

(*f*) Undergrade eggs are good, edible eggs, but with an air space more than three-eighths of an inch in depth and not good enough to grade as standard in the different classifications herewith defined.

In order to carefully consider the working of the present law and any need of revision, I have interviewed Mr. Mickle, the dairy and food commissioner, and also retail grocers and provision merchants, relative to the requirements of this law, and will say that it appears to be fairly satisfactory at the present time. The dairy and food commissioner explains that in paragraph (*a*) of section 4, line 2, "Fixed air space of not more than three-eighths of an inch in depth," should be amended to read, "Fixed air space of not more than three-sixteenths of an inch in depth," as most eggs when they contain three-eighths of an inch space are stale eggs, and for this reason it would be advantageous to amend that section of the law. Careful study would give the impression that the law is a good one, and after it is more thoroughly understood will give better results. With the increasing production of eggs each year, it is apparent that some measure of control will be necessary in connection with this commodity to save the egg market from demoralization.

Upon investigation it is plainly seen that this law, as in instances with many other laws, receives greater support, or more noticeable enforcement, in the larger cities where greater police power exists, and where the wholesaler demands more from producer and outside shipper.

In the grocery store or rural mercantile establishments that deal directly with the farmer, and where eggs are taken in trade, they may be passed on to further market as ungraded and uncandled eggs, but when eggs are sold to the retail trade they must be graded and candled to comply with the law. However, this law meets the approval of the farmer, who has been taught the value of grading his eggs when selling direct in the open market.

There is quite an extensive sentiment throughout the State to sell eggs by weight rather than by the dozen, and while it is difficult to change a custom that has been a well-established practice of trade, nevertheless this sentiment has several features that entitle it to serious consideration.

Now comes the question of devices which are used in the weighing of eggs. They can scarcely be called scales, but should receive some

recognition from this conference in order that a ruling may be made whereby we can properly class them as a scale in our State, bring them under proper inspection, and have them conform with our weights and measures laws. Some of these egg-weighing devices are homemade affairs and their use should be discontinued, as there should be some requirements for accuracy and workmanship.

At the request of the Bureau of Standards, I am presenting for your inspection several samples of these egg scales and might suggest that I think the one with the swivel arrangement is one of the best for this purpose, as it keeps the egg more nearly central while being graded. I will be glad to answer any questions that I can.

(At this point Mr. Dalziel demonstrated to the conference the use of a number of devices employed in his State in the grading of eggs by weight.)

DISCUSSION OF ABOVE PAPER

Mr. Estes. I would like to ask the gentleman from Oregon if there was any rise in price of eggs due to the grading law?

Mr. Dalziel. No; there is only a difference in price for the different grades. But we found this trouble: If the clerk is inclined to favor anybody, he is likely to pick out for him the largest eggs. Personally, I believe eggs should be sold by weight so that everyone would get full value for the money and everyone would be treated the same. I might add that a merchant in Salem showed me six eggs that weighed 1½ pounds; they had been brought in by a rancher who had a new breed of chickens, the eggs of which weighed 3 pounds to the dozen.

A Delegate. I would like to ask if the producers do not object to the idea of having the larger eggs command the higher price? I speak from a little experience I have had. I tried to put across one of these bills in our legislature and our farmers objected to it strenuously.

WEIGHING IN INDUSTRY

By Charles C. Neale, *Special Representative, Toledo Scale Co.*

Mr. Chairman, ladies, and gentlemen of the conference, permit me to express my appreciation of once more being given the privilege to appear on the program of a National Weights and Measures Conference. For many years, while engaged in weights and measures supervisional work, I contributed considerable in quantity, if not in quality, at these conferences, but for the past five years, as a mere manufacturer's representative, I have annually reported here, meek in spirit and weak in action, and with this in mind, in the name of old-time forbearance, I hope you will accept my efforts as being offered in good faith for your interest and entertainment.

The term "weighing in industry" covers a very broad field, and in the slides prepared we will visit a few of the great industrial plants of the country which, to a considerable degree, owe their present development as to both quantity and quality production to the remarkable possibilities opened up by the adaptability of modern automatic weighing equipment to the special needs of modern industry.

I admit the possibility, if not the probability, of being charged with showing partiality toward one make of scale in showing these pictures, but on that score I will say that it is not the present purpose nor desire to advertise here in any way, but it is obvious that I can best discuss those particular scale adaptations and installations with which I am most familiar. I fully realize that the manufacturers of other automatic weighing equipment are solving in their own way many of industry's problems as regards the use of weighing devices in general. However, since one of the special needs of industry is speed in all operations, to cut down manufacturing costs, it naturally follows that automatic weighing must be the kind specifically dealt with, because it is but a part of the automatic machines of every description which have become the essential working tools of all successful industrial operations to-day.

You will recognize the fact, as revealed by the pictures, that "weighing in industry," in a modern sense, is truly a modern thing, and indeed is practically a development of the past dozen years or so. A certain wise man—Solomon, I think—is reported to have declared that "there is nothing new under the sun." But, judging from the continually growing list of new applications of weighing to industry's requirements, I am of the opinion that he did not rank very high either as a scale engineer or a manufacturing magnate.

It must not be thought that accuracy in weighing results has been sacrificed by industry in reaching out for devices that furnish the necessary speed in weighing operations. Nothing could be further from the truth, because weighing forms the basis of every business calculation, and the results of those calculations can not be closer to accuracy than the weighing results are, from the receiving of the raw material into a plant to the shipment of the finished product.

A ton of tungsten represents a considerable sum in money, and when transformed into electric-light filaments it becomes tremendously increased in value; in either case accuracy in weighing is one of the absolute business essentials. In compounding, covering the whole range of manufacture from metal products to the making of a cake, the great essential feature—uniformity of product—can only be secured by accuracy in weighing.

The slides shown here represent every-day installations, working under industry's microscope, so to speak, and they not only typify the scale manufacturer's response to industry's call but serve as an inspiration and invitation to the best brains of the time to go further in industrial weighing development.

(At this point, by means of a large number of lantern slides, Mr. Neale illustrated many adaptations of the weighing principle to the solution of the special problems of industry.)

(At this point I. L. Miller assumed the chair.)

MANDATORY NET-CONTENT MARKING OF ALL COMMODITIES IN PACKAGE FORM

By James H. Craig, *Deputy Secretary of Internal Affairs, State of Pennsylvania*

What is known as the Pennsylvania "commodities" act was approved by the governor of the State the 24th day of July, 1913, but it was not to take effect until the 1st day of January, 1914, and a still further restriction was enjoined by a proviso "That

no penalty shall be enforced for any violation of its provisions as to domestic products prepared or foreign products imported prior to 18 months after its passage." So the law became fully effective in the month of January, 1915.

The large period of grace given by the statute for those who would be affected by it to prepare for compliance with its provisions indicates that the members of the legislature looked upon it as a rather radical measure.

It was the first important constructive legislation proposed by the State bureau of standards which had been established by the next preceding legislature, the sessions of 1911, and its enactment was brought about through the forceful leadership of James Sweeney, the first chief of the bureau, who was well known to many of the older delegates to this conference. It will be helpful to quote such parts of the law as are pertinent to the subject of this paper:

SECTION 1. That the word "commodity," as used in this act, shall be taken to mean any tangible personal property sold or offered for sale.

SEC. 5. It shall be unlawful for any person, firm, or corporation, with intent to defraud:—

(1) To sell, or offer for sale, any commodity on the container of which is marked any false statement respecting the kind, number, quantity, weight, or measure of such commodity, or of any part thereof, or respecting the place or country where such commodity was manufactured or produced, or respecting the quality or grade of such commodity.

SEC. 7. If in package form, the quantity of the contents shall be plainly and conspicuously marked on the outside of the package in terms of weight, measure, or numerical count: *Provided, however,* That reasonable variations shall be permitted; and tolerances and also exemptions as to small packages shall be established by rules and regulations made by the chief of the Pennsylvania bureau of standards.

SEC. 8. Each person, firm, or corporation that shall violate any of the provisions of this act shall be guilty of a misdemeanor, and upon conviction thereof, before any alderman, magistrate, or justice of the peace of the proper county, for first offense shall be fined not more than twenty-five dollars; upon conviction for the second offense such person, firm, or corporation shall be fined not less than twenty-five dollars nor more than one hundred dollars; and upon conviction for the third and each subsequent offense such person, firm, or corporation shall be fined not less than one hundred dollars nor more than two hundred and fifty dollars.

SEC. 9. It shall be the duty of the proper city and county inspectors of weights and measures to enforce the provisions of this act.

I mentioned before that owing to the large period of grace allowed the law did not become fully effective until the month of January, 1915. The legislature was then in session (the Pennsylvania Legislature meets biennially). That those affected by the act were alert was evidenced by the fact that they had the law amended at this session so as to very greatly limit its effectiveness. The amendment reads:

That this act shall not apply to the marking of the net quantity of the contents on containers or packages handled, sold, or offered for sale by wholesalers, jobbers, or commission merchants.

It is necessary now to give some attention to the agencies authorized to enforce the law. The principal agency intrusted with this duty consists of the local inspectors of weights and measures.

The constitution of the State, adopted in the year 1873, provides:

No State office shall be continued or created for the inspection or measuring of any merchandise, manufacture, or commodity, but any county or municipality may appoint such officers when authorized by law.

In pursuance of this fundamental law and various acts of assembly a number of the larger municipalities, at their option, appointed local inspectors of weights and measures, but it was not until the enactment of the act of the 24th of July, 1913 (P. L., 1913, p. 960), that the system became general and effective.

The last above cited act provides:

> The mayors of cities of the second and third class, and the several boards of county commissioners, shall, respectively, appoint one or more competent persons as inspectors of weights and measures, in the respective county or city.

The word "shall" has been held to be mandatory. There are 199 local inspectors in the State, of which number 84 are in the county of Philadelphia, the county being coextensive with the city, 17 in the city of Pittsburgh and county of Allegheny, and 98 in the remaining cities and counties. The salaries of these officials are paid by the respective municipalities and it was decided in Goodwin *v.* City Council of Bradford, 248 Pa. 453 that "The inspector is a municipal officer and the mere fact that he is required to report to the State does not change his status."

The State bureau of standards has no jurisdiction over the local inspectors, but they are required to report at least once every month to the bureau, as follows: (1) The number of tests made since the last preceding report. (2) The number of weights, measures, and balances found by such tests to be correct. (3) The number of weights, measures, and balances found by such tests to be false. (4) The number of prosecutions instituted by such inspector since the last preceding report, together with the name of the accused, the title of the court where prosecution was instituted and the result of such prosecution. (5) Such other matters as the chief may from time to time prescribe.

There are no constitutional restrictions as to local inspectors. They can exercise any and all powers of inspection of quantity and quality of commodities and manufactures as well as the testing of weighing and measuring devices, as the laws may sanction.

A second agency for enforcement is the State bureau of standards in the department of internal affairs. The several acts of assembly authorize a force for this bureau to consist of a chief, assistant chief, stenographer, and 12 deputies. For several years it functioned very creditably with a complete organization, but three years ago the present governor reduced the appropriations granted by the legislature so materially that not more than two or three deputies have been employed continuously. The chief of the bureau and his deputies are empowered by law to exercise the same powers of enforcement as the local sealers of weights and measures.

I hope that I have succeeded in presenting clearly two propositions, first, the law governing the sale or offer for sale of commodities in package form, and second, the agencies charged with the enforcement of that law. An understanding of these is a necessary preliminary to that which is to follow, viz, the experience of the State in enforcing this act.

When I accepted the assignment to write this paper, as late as April 27 last, I did so in an offhand manner, believing that it would be a simple task. It meant calling upon the bureau for data and statistics garnered there and perchance digging in the legal digests

for the decisions of the courts interpreting the act. Both of these sources of information proved disappointing. At the bureau I found no long record of prosecutions. In the law books I found but one decision interpreting the act, and that one not by a court but by a deputy attorney general. I asked myself the question, "Is this act a dead letter?" But a further quest in the bureau answered that question. An examination of the reports of the inspectors revealed that in a period of nine years they had inspected and reweighed 4,291,718 items, consisting of packages, baskets, boxes, bags, milk cans, and barrels. Of these, 3,999,646 items were approved and 292,072 were condemned. I think that all will agree that practically 86 per cent compliance with the law is a very good showing, and the most amazing part of the story is the almost complete absence of litigation and prosecutions.

A system of enforcement that operates with so little apparent friction and yet so effectively is certainly unique. One naturally inquires, "How is it done?"

It is first to be noted that the law applies to the retailer only because of the exemption of wholesalers, jobbers, and commission merchants.

As the large majority of commercial packages are purchased by the retailers from the exempted classes, a situation was created which impressed the average person as being manifestly unfair and unjust. Inspectors when confronted with the duty of enforcing the law undoubtedly felt that way and were inclined to be as lenient as possible to unfortunate retailers caught with packages of commodities not put up by themselves which failed to comply with the law.

It was in this spirit of leniency, I imagine, that inspectors resorted to a remedy conferred by law upon both State and local inspectors, as follows:

> For the purpose of making such test each inspector, at any reasonable time and without formal warrant, may enter upon any premises; and may, on any public highway, stop any vendor or dealer, or the agent or servant of such vendor or dealer, or stop any vehicle used in delivering any commodity which is weighed or measured as delivered. He may condemn and mark as condemned, or may seize any false or illegal instrument or device used, or intended to be used, in weighing or measuring.

The efficacy of this remedy seems to lie in the words "may condemn" or "mark as condemned." Each inspector carries a stamp bearing the word "condemned," and when commodity packages falsely labeled or deficient in weight are found in a merchant's stock, they are marked condemned and he is forbidden to sell or offer them for sale. If a merchant packs commodities himself, as a matter of convenience in "rush" times, and an inspector discovers that the packages or containers are not labeled with the net weight, or upon reweighing he learns that they are short weight, he compels marking and repacking at full weight before they may be sold or offered for sale.

If time had permitted, I would have written to every inspector in the State asking him to give me his experience in enforcing the act. As this was impossible, I conferred with and wrote to a few of the most experienced in the largest centers of population. Their replies

are but typical of what might be expected from any number of similar inquiries.

W. F. Swoger, chief of the bureau of standards, who was at his home in Pittsburgh for some time because of illness, and who would doubtless have discharged the service I am endeavoring to do but for the uncertainty of his recovery in time to attend this conference, wrote:

In regard to the inquiries pertaining to this act, we occasionally receive letters from both manufacturers of food products and sealers of weights and measures displaying a splendid spirit of cooperation. I would say this law is not a dead one in this State. It has become established to such an extent that it is very seldom that prosecutions are necessary.

From personal observation, the only violations of this act are by the retailers who may, around the holiday seasons, unknowingly buy novelty candy boxes, such as heart shapes, miniature cedar chests, etc.

The solution for these minor violations is for the local sealer to educate the retailer as to these violations, which he usually does, thereby accomplishing the purpose of the act without going to law.

M. G. Livingston, chief inspector of the division of weights and measures, city of Pittsburgh, wrote:

We have made several informations under our State act and in all cases imposed fines on the violators. If you will consult the records of the United States Supreme Court, you will find that the national law has been appealed from but upheld by the court. These appeals were made by the packing companies in cases brought against them for not having the net weight of smoked and fresh meats marked on the packages. When merchants weigh up and pack goods to be sold during a rush period we require the net weight to be stamped on the package.

It is interesting and pertinent to note here and now that the sole decision I have found in the law books on this act related to hams and bacon. It was rendered June 15, 1915, by Kun, deputy attorney general, upon request of James Sweeney, chief of the bureau of standards. I quote from the decision reported 24 Pa. Dist. Rept. 671:

Whether the sale of hams and bacon covered with paper or cloth, or sold in wrappings of any kind, would be a sale "in package form" would depend on whether or not they were sold per package as such or by separate and individual weight. You do not state the facts on this point necessary to specifically determine the question, but, if I understand correctly, hams and bacon so covered or wrapped are not sold per package as such, the weights of the hams and bacon not being uniform, but are in each instance sold by weight per ham or bacon as wrapped, of which the purchaser is fully aware.

I am therefore of the opinion that, as to hams and bacons covered with paper, cloth, or other wrapping and so sold, the act does not apply, and in such cases it is not necessary that the quantity of the contents be marked on the outside of such package. The words "in package form" were similarly construed in reference to the same subject matter in the case of State *v.* Swift & Co., 120 N. W. Repr. 1127 (Neb.).

The reasoning in this opinion applies to all other commodities referred to in your communication. If they are sold per package as such, "the quantity of the contents must be plainly and conspicuously marked on the outside of the package in terms of weight, measure, or numerical count," as the act provides. If they are wrapped merely for sanitary purposes and are not so sold, but in each instance are weighed, though with the container, covering, or wrapper, of which the purchaser is fully aware, the act does not apply.

Such is the finesse of the law when prosecutions are resorted to.

D. Frank Black, supervisor of the bureau of weights and measures for the county of Philadelphia, wrote:

This bureau has had a very favorable experience with the packers and we have had little to complain of as to the compliance with this section of the weights and measures laws. We have had no prosecutions or violations, as most of the manufacturers seem to have been conversant with this act prior to its passage and enforcement. There has been no criticism by those affected by the law and all seem willing to comply with it in every respect.

J. A. Briggs, State deputy inspector, located at Wilkes-Barre, in Luzerne County, one of the largest and most populous counties of the State, wrote:

As to marking of commodities in package form, I went over this matter with some local sealers, and am informed that there were no prosecutions. The reason for this was that, by mistake, some of our local merchants might either forget to properly mark packages, or through incompetent help, incorrectly weigh same, and it would be unfair to prosecute a merchant whose standing in the community had been unquestionable for years, and yet his entire business might, through one prosecution, be lost to him. It seems fair and just that a merchant be notified on his first offense and prosecution follow on later offense.

I had an instance of this kind just last month, in a store where I weighed about a hundred packages of sugar, about 90 per cent of them being short. I caused all the bags to be emptied in my presence, and gave the manager of the store a good talking to. The matter in some way or other reached the ears of the superintendent of the district, and when I went back 10 days or 2 weeks after, I was told the manager had lost his position through the incident.

George B. Nebinger, local sealer for the city of Harrisburg, well known to many delegates, gave me information agreeing with all of the foregoing statements.

There is no need to prolong the discussion further. I am convinced from the energetic manner in which the inspectors enforce the act, as shown by their reports to the bureau of standards, and from the uniform testimony of experts quoted, that the commodities act has been of great benefit to the citizens of the State in assuring to them more just and honest weights and measures, and that the method of enforcement although quiet, simple, and nondemonstrative, is nevertheless particularly effective and successful.

The Acting Chairman. The next number on the program is the report of the committee on specifications and tolerances on modification of the specifications and tolerances for liquid-measuring devices, which will be presented by F. S. Holbrook, chairman of the committee.

The suggestion has been made to let this number go over until to-morrow morning. What is the will of the conference?

Mr. Cummings. I think we can discuss the tolerances to-morrow morning and the demonstration of standards of mass can come at this time, as it is getting rather late now.

The Acting Chairman. Is there any objection to allowing this item to go over?

A Guest. Mr. Chairman, it so happens that there are a number of representatives of pump manufacturers here. If it would be possible to discuss this matter to-day, it would be very much appreciated by these representatives, so that they could leave to-night and save a whole day.

The Acting Chairman. If there is no objection we will go ahead with this item.

REPORT OF COMMITTEE ON SPECIFICATIONS AND TOLERANCES ON MODIFICATION OF THE SPECIFICATIONS FOR LIQUID-MEASURING DEVICES, PRESENTED BY F. S. HOLBROOK, CHAIRMAN

Prior to the sessions of the Eighteenth National Conference held last year, your committee on specifications and tolerances carefully reviewed some of the codes which had formerly been adopted by the conference, and, as you will remember, recommended amendments to some of the sections. This year your committee has continued its work along these lines and in this connection has taken occasion to give special consideration to the code of specifications and tolerances for liquid-measuring devices.

This work follows closely upon a review of these specifications by another committee, the technical committee on weighing and measuring devices of the Federal Specifications Board, which, during the past year, reported a specification which is now in force and effect for use in Government purchases of these devices. The modifications agreed upon and incorporated in that code by the latter committee have received the attention of your committee, and wherever it appeared that the amendments made improved the code, it was decided to recommend these changes for adoption by this body, to the end that the various specifications in relation to these devices may be made as nearly uniform as possible.

Uniformity of requirements such as these greatly benefits everyone concerned; since the manufacturer is not then compelled to produce his device in different forms to meet varying requirements, efficiency of production is stimulated, economies effected, and a consequent economic saving is the result.

Your committee, therefore, is now introducing for consideration this report, involving some modifications of existing specifications for this class of apparatus. Several days ago the detailed recommendations along these lines were placed in your hands in order to afford you the opportunity of familiarizing yourselves with them before they should be taken up for action.

The entire personnel of the committee has participated in this work.

Respectfully,

(Signed) F. S. Holbrook, *Chairman*,
Wm. F. Cluett,
A. W. Schwartz,
Chas. M. Fuller,
I. L. Miller,
Committee on Specifications and Tolerances.

DISCUSSION OF ABOVE REPORT

Mr. Holbrook. Since it is probable that some of the delegates and guests do not have available the copies of these recommendations formerly supplied, we will distribute additional copies to those who desire them. Also there are available here copies of the present code to which these amendments are referred.

The first amendment relates to specification No. 1 and involves the striking out of the sentence reading "Such a device often consists

of a pump, or a pump in combination with other mechanism" and the insertion in lieu thereof of the following:

These specifications shall be construed to apply only to liquid-measuring devices of the retail type; that is, devices which on account of the character of their primary indicating elements are obviously designed for unit deliveries of less than 50 gallons: *Provided,* That this specification shall not be construed to apply to water meters of any size.

The portion of the original text now struck out was considered a necessary explanation at the time the specifications were first drafted, but is now considered unnecessary.

In relation to the material added it has always been the intention to have these specifications refer solely to retail devices, but so many wholesale devices are now coming on the market that it seems reasonable to explain that the retail type only are included. Moreover, the title of the specifications is so general, "Liquid-measuring devices," that it has been deemed advisable specifically to state that water meters are not intended to be within the purview of the specification.

The Acting Chairman. Following our usual practice, unless there is objection to an amendment, we will understand that the amendment is concurred in and we will vote on the report as a whole after all the amendments have been read.

Mr. Holbrook. The next amendment is concerned with specification No. 2, and consists in adding the word "all" before the words "liquid-measuring devices" in line 1. That is merely to put the specification in the usual form.

The next amendments occur in specification No. 5. The first consists in striking out the word "cycle" in line 2 and inserting in lieu thereof the following: "per cycle of the primary indicating elements,". This is the operation of interest in this connection. In a meter, for instance, the number of cycles of the interior operating mechanism may differ from the number of the cycles of the indicating parts on the outside of the meter, but the weights-and-measures official is interested only in the latter, and if the meter registers correctly it is of no particular concern to him how many cycles of the interior mechanism are being executed during one cycle of the indicating parts. Thus this is merely, in our opinion, a clarification of the present specification.

The second amendment to specification No. 5 consists in adding the word "money" before the word "values" in line 8. That addition is made merely to clarify the meaning.

The third amendment to specification No. 5 involves the striking out of the words "the device shall be so constructed that the price per gallon at which it is set at any time must be clearly indicated to the customer either by automatic means or by means of a sign conspicuously displayed on the device," and the insertion in lieu thereof of the following:

either the device shall be so constructed that the price per gallon at which it is set at any time will be clearly indicated to the customer by automatic means or this price shall be shown by means of a sign conspicuously displayed on the device.

There is no change in meaning involved, but it is considered that the wording suggested is preferable.

In specification No. 6 it is proposed to add the words "the initial zero condition and" before the words "the amount delivered" in lines 2 and 3. This is a new requirement. It is obviously proper that every pump shall show by its indicating elements when it is in proper condition to begin a delivery, and yet a review of the specifications did not develop the fact that such a zero indication is specifically required. This does not mean that all the various indicating elements on the pump must automatically return to zero at the end of an operation, but it merely assures that the opportunity is offered to the customer to check the fact that the indicating elements are in the initial zero condition before a delivery is begun.

Another change in specification No. 6 consists in striking out the word "will" and inserting in lieu thereof the word "shall" in line 3, in order to make it comply with our usual form.

Specification No. 8 is proposed to be amended so that the first paragraph will read as follows:

Constancy of delivery.—The amounts delivered by any liquid-measuring device shall not vary from the standard by more than the tolerance hereinafter provided (1) irrespective of the speed at which the device is operated, except that when operated considerably faster or slower than normal speed of operation the tolerance shall be applied in deficiency only; that is, the device shall not be deemed to be incorrect by reason of the tolerance in excess being exceeded during such unusual methods of operation, and (2) irrespective of the time elapsing between operations, subject to the conditions of the special elapsed-time test described below.

There has been incorporated in subdivision "(1)," in effect, an extension of a principle formerly adopted. It will be remembered in relation to the piston-type liquid-measuring device that it was demonstrated some years ago that when such a device was operated at a faster speed than was ordinarily adopted by the operator, especially at the end of the stroke, and the piston was caused to stop very suddenly by being brought with considerable force up against the stop, the inertia of the moving column of liquid would be such that some unmeasured liquid would pass through before the valves would be closed by the action of gravity. That resulted in excess measure in every case. It was deemed that if the operator operated his pump in such an abnormal way, and that as a result overmeasure was delivered, it was not necessarily the fault of the apparatus; the operator had it in his power to prevent the delivery of excess measure by operating the pump in the normal manner. Therefore, it was not considered that because overmeasure was given under these peculiar conditions the pump should be condemned; and at that time the proviso in reference to "faster than the normal speed of operation" was added to the specification. With the increase in the use of the meter for measuring gasoline this type of apparatus has received increased attention. It is apparent that some leakage through the gasoline meter will ordinarily take place. Clearances are necessary to enable these devices to operate and while these clearances are, in a well-built meter, very small, nevertheless a small quantity of unmetered gasoline will go through the meter. When the delivery is made at a reasonable speed this unmetered liquid will not be an important percentage of the total liquid passed, and it can be taken care of in the adjustment of the meter so that correct

measure will result. However, when the meter is slowed down to an abnormally slow speed (such as a delivery of 1 or 2 or 5 gallons per minute from a meter with a capacity of 40 gallons per minute) it is to be remembered that this unmetered liquid passing through the meter will be a much larger percentage of the total delivery and may cause the tolerance to be exceeded.

It seems there we have a case comparable to the piston-type device. We have already specified that when such a pump is operated at an abnormally rapid speed the pump shall not be condemned on account of excess deliveries. The proposed wording carries this principle further and provides that a device shall not be condemned on account of excess measure which is the result of operation at an abnormally slow speed.

The second paragraph of specification No. 8 has been amended to read as follows:

A special elapsed-time test shall be made to determine whether the device is satisfactory in respect to condition (2) above. In order to comply with this test the condition of the device shall be such that a period of nonuse of one hour shall not result in an error on the first delivery of the device after such period of nonuse greater than the appropriate tolerance allowable on the smallest amount which the device is designed to deliver, this tolerance being selected according to whether the device is or is not a new device; and a period of nonuse of six hours shall not result in an error on the first delivery of the device after such period of nonuse greater than 10 cubic inches, or in the case of a new device, 5 cubic inches.

There is only one small change in that paragraph designed to make it clear whether the tolerances on new apparatus or tolerances on apparatus in use are to be applied during the elapsed time test.

In view of the use of the words "Normal speed of operation" it becomes necessary in the specification to define these words. That is the substance of the first note. [Reading:]

NOTES.—"Normal speed of operation" shall be construed to mean that range of operating speeds which may reasonably be employed in ordinary commercial usage; in the case of meters this shall mean operation within the limits of discharge capacities customarily specified by the manufacturer for the particular type of meter under test: *Provided, however,* That the maximum and minimum deliveries so specified shall be in the ratio of at least 4 to 1.

The last part may be explained as follows: A manufacturer turns out a meter for which he may claim a range of deliveries of from 5 gallons per minute to 50 gallons per minute. In other words, he may guarantee that the meter will deliver correct amounts when operated within these limits. In that case it is perfectly proper for the sealer to test deliveries made at rates of 5 gallons per minute and of 50 gallons per minute or at any rate of speed in between, and insist upon correct measure within tolerances. However, under this specification the manufacturer is not obliged to claim so wide a range as that. If the maximum speed of operation of the meter is 40 gallons per minute, he need not claim more than that the meter will deliver correct quantities at the rate of 10 gallons per minute, which is one-fourth of the maximum delivery. Then the official will be limited in his test to rates of flow between 10 gallons per minute and 40 gallons per minute on that meter. However, the manufacturer can not claim too limited a range—for instance, that a meter will deliver correctly only between 35 and 40 gallons per minute—since it is considered by the committee that sufficient range must be allowed the

user or the operator of the meter to meet reasonable needs of operation. Therefore, it is specified that all meters shall operate correctly at full capacity and that they shall also operate correctly at at least one-fourth of that speed.

Mr. CUMMINGS. Mr. Chairman, I want to ask a question at this point: Did the committee consider whether or not it is desirable that the manufacturer should specify the pressure along with the speed of operation? We have approved on that basis one meter and we have some others under consideration where they specify the pressure which produces the maximum speed of operation.

Mr. HOLBROOK. It seems to me that is largely a question of installation. When the sealer encounters the meter, it is usually installed to operate under a certain pressure. The sealer will normally test the meter under that pressure and if it is not correct at that pressure the meter will be condemned. If the pressure is not the pressure advocated by the manufacturer the difficulty can be avoided, perhaps, by modifying the pressure until it corresponds with that recommended; but regardless of what the manufacturer claims in that relation the pressure under which the meter operates when put in service is the pressure in which the sealer is interested, because if incorrect deliveries are made the sealer has no course open other than to condemn the meter.

Mr. CUMMINGS. In cities where meters are operated under hydraulic pressure that pressure will vary according to the height of the installation or location of the meter compared with the height of the reservoir, and we, in considering the approval of that type, believe that the matter of pressure should be considered.

Mr. HOLBROOK. In tests involving general approval of type the official may be obliged to state in his approval the pressure for which the approval is granted; then if the meter is installed under some other pressure it may simply result in the meter being found incorrect due to an unauthorized character of installation.

Mr. CUMMINGS. I have no objection to this as it reads.

Mr. HOLBROOK (reading):

In the special elapsed-time test described above, allowance shall be made for errors due solely to a change in volume of the contained liquid, resulting from temperature variations alone, since an error of this character is unavoidable in the case of volumetric measurements of this kind, when the apparatus is standing unused. This change in volume due to temperature variations is, however, small in amount for all ordinary variations of temperature, amounting in the case of gasoline to about 0.6 per cent for each 10° F. change of temperature, or about 1.1 per cent for each 10° C. change of temperature.

In applying the elapsed-time test outlined above it is recommended that the delivery be not made through a hose, since the amount of gasoline necessary to wet the inside of the hose will cause an additional shortage in the delivery.

No changes are made in these paragraphs.

The amendments to specification No. 10 involve merely adding the word "money" before the word "value" in two places, and changing the word "vertical" to the word "straight."

(Secretary's note: At this point discussion was commenced in relation to the amendment proposed by the committee to specification No. 11. After this discussion had continued for some time, the conference adjourned, before any conclusion was reached, as noted below. When the subject was taken up at the Friday morning ses-

sion many of the arguments which have been already advanced were necessarily repeated. In order to eliminate much duplication and to assemble all the material in relation to this matter in one place, it has been deemed advisable to transfer all that portion of the discussion given at this session which was not repeated at the Friday morning session to the latter session. It will, therefore, be found at that point.)

Mr. AUSTIN. Mr. Chairman, it strikes me that this is a very important question, and also that we have a small representation of the delegates who are interested in this vital question before us. Inasmuch as the hour is getting late, it seems to me that it would be a wise thing if this subject could be deferred until the morning session, and in order to bring that matter before the conference I will move that this matter be deferred until to-morrow morning.

(The motion was seconded.)

Mr. FLAHERTY. If you please, make it the first paper of the morning session.

(The question was taken, and the motion was agreed to.)

(Thereupon, at 5.13 o'clock p. m., the conference adjourned to meet at 9.30 o'clock a. m. Friday, May 28, 1926.)

SEVENTH SESSION (MORNING OF FRIDAY, MAY 28, 1926)

The conference reassembled at 9.30 o'clock a. m., at the Raleigh Hotel, Dr. George K. Burgess, president, in the chair.

DISCUSSION OF REPORT OF THE COMMITTEE ON SPECIFICATIONS AND TOLERANCES ON MODIFICATION OF THE SPECIFICATIONS FOR LIQUID-MEASURING DEVICES—Continued

Mr. Holbrook. Mr. Chairman, when the conference adjourned last night the members were discussing the amendments to specification No. 11 for liquid-measuring devices. The first amendment merely proposes to add the words " to a minimum " after the word " reduce," and to strike out the same words at the end of the specification. This is merely a question of diction.

The second amendment proposed, however, is new material. It is as follows:

This specification shall be construed to require that in the case of all devices which are equipped with a glass measuring chamber and in which the quantities delivered are determined by bringing the liquid surface into coincidence with indicators, pointers, or graduations which at some point or points or at all points constitute the sole or most sensitive means of determining the amount of liquid discharged, such pointers, indicators, or graduations shall be located inside the glass measuring chamber and in contact with the surface thereof.

The above is proposed to be added at the end of the specification in relation to parallax. It is stated by the present specification that parallax shall be reduced to a minimum. This is an interpretation of that phrase in one connection.

Now, the committee has one amendment to the amendment. It suggests that, instead of requiring that the indicators on the inside of the bowl be actually in contact with the surface of the glass, they be not less than one-sixteenth of an inch from the inside surface of the chamber. The latter part would then read as follows:

shall be located inside the glass measuring chamber and not more than one-sixteenth inch from the surface thereof.

This one-sixteenth inch separation is allowed, since slight surface defects in the glass make it impracticable to insist that each indicator be in actual contact with the glass.

As we have said, this specification is designed to furnish an interpretation of the requirement that parallax be reduced to a minimum. When the indicators are on the outside of these glass chambers the pointers are usually about one-fourth of an inch horizontally away from the liquid, the surface of which is to be brought into coincidence with the indicator, this being the thickness of the glass chamber itself. It is a fact that different deliveries will be obtained when the operator assumes different positions in reference to the device during the operation. When he stands close to it and brings

the liquid surface into apparent coincidence with the indicator there will result a certain delivery. If, however, he steps back several feet and again attempts to bring the surface into apparent coincidence with the indicator a different delivery will be obtained, since the surface of the liquid and the indicator appear to have changed their positions relative to each other. This interpretation requires that when the indicators are the sole or most sensitive means of determining the delivery, they shall be on the inside, since they will then be in contact with the liquid and parallax will be largely eliminated.

Mr. Foster. Mr. Chairman, this applies to pumps without the overflow-stop arrangement?

Mr. Holbrook. Yes; this has not been made applicable to pumps in which the quantity determination is obtained by a mechanical cut-off.

Mr. Tinkey. Mr. Chairman, some pumps are made that can be used either way.

Mr. Holbrook. This applies when no mechanical stops are provided. The committee is of the opinion that when mechanical stops are provided those mechanical stops should be used. It is a question of regulation to see to it that the device is operated in the manner intended.

Mr. Cummings. Mr. Chairman, I think the adoption of this specification would be a long step backward. The larger proportion of the pumps now in operation have some automatic means of regulating the amounts they will deliver. We might hear from the gentleman from Alabama. In their tests they found material discrepancies on 1 and 2 gallon deliveries. I am satisfied that in Massachusetts we would not accept such a specification as this. We are now working under specifications practically the same as these with some additions that were adopted by the Massachusetts Association of Sealers of Weights and Measures.

Mr. Foster. Mr. President, I might say for information that in Massachusetts no sight-measuring pumps should be used according to the Massachusetts Association of Sealers of Weights and Measures.

Mr. Cummings. Under the law, it is probable that no such type will be approved in the State.

Mr. Holbrook. I can not agree with Mr. Cummings that this is a step backwards because sight-measuring devices under these specifications are now allowed. This specification provides, in the opinion of the committee, for a better positioning of the indicator. If that be true, it must be granted that this is a step forward.

In relation to the Massachusetts specification forbidding all measuring devices which determine a delivery by drawing down a liquid surface until it is in coincidence with an indicator, this conference has never adopted specifications forbidding those devices; neither is your committee recommending at the present time that that step be taken.

Mr. Flurry. Mr. President, I fully agree with the secretary relative to this not being a step backwards, but it is a serious question in Alabama as to whether or not we will approve, as far as the type is concerned, a pump of the nature of which we are speaking.

It seems to me that Mr. Cummings and myself would be put in a rather embarrassing position in indorsing the adoption of specifications recognizing these pumps and then proceeding with actions to disallow their use in our States, although we grant that the amendment provides decided improvement over present requirements. The question seems to me to be whether or not they ought to be allowed.

Mr. Holbrook. Mr. Flurry, is it a fact that the pumps which you do not desire to indorse or approve will not deliver the quantities which they are designed to deliver within the tolerances provided?

Mr. Flurry. That is our experience. Not long ago relative to this matter I made a personal investigation of the actual operation of such pumps. I found this condition prevailed, that pumps of 10-gallon capacity were operated to deliver quantities which were outside the tolerance in almost every instance. In fact there were very few instances in which we found the operator could use the pump to deliver quantities within the tolerance. We would test the pump at capacity and almost invariably it would show well within the tolerance at the 10-gallon point, but the point is that the operator can not use it to deliver at all points within the tolerance allowed.

If we are going to adopt tolerances which will oblige the manufacturers of mechanical stop pumps so to construct them that they will operate within the tolerance—we figure that these ought to be the maximum allowable errors—why not exclude the pump, the errors on the deliveries of which will in fact many times exceed the tolerance allowed even when operated by an operator whose intentions may be perfectly good. We found in numerous instances operators were delivering on 2 or 3 gallon deliveries as much as 31 cubic inches short. Why should this conference approve a pump under any specification which can be operated—and as shown by our conditions are being operated in almost every instance—to short measure the customer? The operator is naturally going to take care of himself and he has to take care to see that the level does not drop below the indicated point; therefore, the chances are that in almost every instance it is going to be a short-measure delivery. I can not see the fairness in this conference adopting specifications which will admit the use of such a pump and hold the manufacturer of other types of pumps to a set-down tolerance. I do not believe it is just.

Mr. Holbrook. I do not believe that you are not in accordance with these specifications, and I do not believe you prejudice the position which you have taken. The remedy for the conditions which you cite is in another place.

The first paragraph of specification No. 7 provides that "All liquid-measuring devices shall be so designed and constructed that they can readily be operated to deliver each quantity for which a graduation, stop, overflow pipe, or other indicating means is provided, within the tolerance on such amount hereinafter provided." If you meet with any specific make of pump which can not readily be operated to deliver each quantity which it is designed to deliver, within the tolerance, then under these very specifications you should not give approval to such a pump. The remedy is there for you, in specification No. 7, in relation to sensitiveness.

Mr. Cummings. Mr. Chairman, and gentlemen, it has been the experience of a great many inspectors that it has been practically im-

possible to deliver the quantity within the tolerances. Not so long ago we made an inspection of such a pump in Boston. It was submitted for test, and we invited all the sealers within 50 miles of Boston to come in and witness the test. At that station three operators tried to make the pump deliver within the tolerance, but without success. Then the representative of the pump company, who was entirely familiar with that device, tried but without success. Now, the recent developments of sight-measuring pumps have brought out a 10-gallon container. Those that I have seen are more difficult to read because of the larger wire netting with which they are inclosed for fire protection. That wire netting throws a shadow on the glass in many cases, which makes the device even more difficult to read.

Mr. Holbrook. There is no question but that such a device, the test of which you have described, which can not readily be operated to deliver within the tolerances specified, should be refused approval under the first paragraph of specification No. 7, which was written to cover that very point.

Mr. Foster. Mr. Chairman, I believe, from the experience I have had—we made a great many tests of this type of pump before the present specification was amended in Massachusetts—that it is impossible to deliver within the tolerance. As Mr. Cummings has said, when men who are supposed to be experts and men familiar with it fail to keep within the tolerance, what is going to happen when an owner says to the boy "Go out and give that fellow some gas." The customer may get overmeasure, but he is more likely to get undermeasure, and I do not think it is good policy. We certainly can not go on record and vote for this specification under the present conditions as we find them in relation to visible, sight-measuring pumps.

Mr. Tinkey. Our experience in Ohio is similar to that of the others. I find that they can not deliver within the tolerance with a sight-measuring pump.

Mr. Flurry. Mr. Chairman, I notice this difference in testing 5 and 10 gallon capacity pumps, in line with the point just made. The error on the 10-gallon pump was very material, over that found on 5-gallon pumps. But even the 5-gallon pump was not consistently operated within the tolerance. We found a number of instances where the operator was a very careful and experienced man and had been reading pumps for a long time and did use care—particularly in our presence when he knew we were testing that pump—and would read it within tolerance, but I do not believe the majority of the ordinary filling-station operators without the presence of an inspector would operate even the 5-gallon capacity pump within the tolerance allowed. At least our experience thus far has been thus.

Mr. Fuller. Mr. Chairman, we have had probably as much experience with the testing of visible devices as any place in the country. We have several hundred of them; some of them have been in operation for several years. We subject them to careful tests, and I will say they deliver within the tolerance. We do not receive any complaints on them, and we would not pass them if they did not deliver accurately.

Mr. Holbrook. Of course, the delivery is a function of many things; it is a function of the type of indicator used; it is a function of the effective diameter of the cylinder; and it is a function of

the relative position of the indicator and the liquid, to mention just a few of them. The committee on specifications has not taken the position that all the so-called sight-measuring devices should be condemned merely because they are sight-measuring devices. The committee believes that sight-measuring devices should not be thrown out in toto—the good, if there be any, with the bad, if there be any. If sight-measuring devices are on the market or come on the market, which can readily be operated to deliver within the tolerances, then, as a matter of fairness, they should be accepted. The criterion of acceptability is specification No. 7 which I have mentioned.

In general, it is the opinion of the committee that a device should be such that the operator can readily operate it within the tolerances and the purchaser can readily check the delivery within the tolerances. If the operator fails to draw the liquid down to the proper point and this failure is perfectly obvious to the operator and to the customer, and the customer does not object to such a delivery, then the customer is one who can not be protected by weighing and measuring regulations. We believe the customer should be given a chance to check the operator, and if the operator is obviously giving short measure the customer should be advised of that fact by the piece of apparatus itself. This being accomplished, then the failure of the customer under such circumstances to object to the delivery, puts him outside of the pale of men who can be protected. Consider scales, automatic or otherwise. Suppose one goes into a store and asks for a pound of a commodity. Suppose the scale is well and truly graduated, and the indications are within sight of the customer. A pound having been asked for, the operator may place such an amount of commodity on the scale that 14 ounces is indicated. He may then seize the commodity and wrap it up. A short-measure delivery has been made. In such a case the operation was visible to the purchaser, and it was apparent that short measure was being given; the customer should make a complaint. It seems that if any device indicates, when the delivery is made, that a correct delivery is not being made by the man operating the device, weights and measures regulation of type of equipment has gone as far as it readily can go. At that point regulations must drop out of the equation, and the purchaser must start protecting himself. In other words, proper equipment should give the observant purchaser the information that incorrect delivery is being made, when this is the case. Probably no piece of apparatus is "fool proof."

In the case of devices which have mechanical cut-offs there is always a valve by means of which the delivery can be stopped at any time. Thus, even when the mechanical cut-off is properly set, the flow can be stopped before the correct amount, as determined by the mechanical cut-off, has been delivered. Short measure will be the result and the unobservant purchaser will be none the wiser. On the piston-type pump there is a prominent scale marked in gallons over which a pointer travels during the operation. If, in the case of a 5-gallon order, the purchaser allows the operator to advance the indicator to 4½ instead of to 5, and then to reverse the stroke and return to zero, short measure will have been delivered. It is within the power of the purchaser to object to the short measure and if he

makes no objection mere regulation of the type of device can not prevent the fraud.

Mr. Cummings. After delivery is made into a tank there is no way of proving it?

Mr. Holbrook. In the case last mentioned there would be no way of proving that an operator reversed at 4½ instead of at 5, the evidence having been destroyed as soon as the reversal of the crank has taken place; but in the case of the visible, the error is still apparent until more liquid is added to or withdrawn from the cylinder.

Mr. Cummings. A man making a purchase may think he is getting full measure when, as a matter of fact, it is 30 to 40 cubic inches off on the delivery; the customer is not accustomed to checking that sort of scale of graduations. I question very much if any of the sealers will be able to say whether the delivery is within the tolerance without measuring. I am not qualified to do it and I question if any one else is.

Mr. Blaylock. Mr. Chairman, we have both types of pumps that the gentlemen speak of—the one with the indicators on the inside and the other with the indicators on the outside—and I find that I can make a much better test when they are on the inside rather than on the outside. I would rather see all pumps have a mechanical cut-off on each amount, 1, 2, etc., up to 10, but if these were required there are many pumps now in use that would have to be thrown away. Where we can not have that equipment that I mention, I think it would be a great improvement to put the markers on the inside and have them come against the glass or very close to the glass. Such a pump is much easier to read than one with the marks on the outside. It is very hard to keep within the tolerance when the pumps are marked on the outside.

Mr. Dalziel. Mr. President, personally I do not altogether approve of the glass-cylinder devices as described. I do not believe any man can stand and look up and read the glass accurately. We have a lot of them in use in our State. If the conference disapproved of them I would start to throw them out, but I think the difficulty can be overcome.

Mr. Cummings. About five years ago we adopted the specifications that had been theretofore adopted by the National Conference, with some additions which we put in, in view of our experience, and at this time I want to move a substitute for the amendment that the committee has suggested.

I would move, Mr. Chairman, that the amendment to specification No. 11, reported by the committee, be stricken out, and that the following be inserted:

> Every limited-quantity liquid-measuring device shall be provided with a positive stop for each gallon, multiple of a gallon, or binary submultiple of a gallon which the device is designed or employed to deliver. A plain statement of the maximum capacity of the device shall be so placed as to be readily seen by the purchaser, and the value of each intermediate stop shall be conspicuously indicated.

This would be nonretroactive and would not apply to pumps already installed.

Mr. Flaherty. I second the motion.

Mr. Maroney. I think the matter is entirely out of order. Mr. Chairman, it is a fact that we want to change the position of the

pointers—take them from the outside and put them in the interior of the glass bowl. I don't see how that motion has anything to do with that subject.

Mr. Holbrook. I think it is perfectly competent for this amendment to be proposed at some point during the discussion, but I do not think that it is a substitute. I do not think it is germane to this particular specification. As I see it, the amendment has nothing to do with the question of parallax which is the substance of the specification under discussion.

The Chairman. Practically anything is in order for discussion if it is under the subject that we are taking up. As I heard Mr. Cummings's motion for a substitute amendment, it was not on the subject of parallax. Is that correct?

Mr. Cummings. Mr. Chairman, my idea is this, that if my amendment were adopted the question of parallax would not be so important because we would not be measuring by sight, then. The marks on the glass would be merely an approximate indication to the purchaser of the delivery, but the actual amount of delivery would be determined by the positive stops.

Mr. Holbrook. Mr. Cummings, do you not think that the very fact that the indicators are still an indication to the purchaser as to whether correct measure has been delivered by the device makes a specification on parallax absolutely essential? The purchaser may be at varying distances from the pump, and in certain positions the purchaser will be given the impression that he is receiving a short delivery when, perhaps, the contrary is the case. As I see it, your amendment is an entirely proper subject for the conference to consider, but further consideration should be given as to the proper specification to which it should apply.

Mr. Cummings. Mr. Chairman, if it is desirable or necessary to define the word "parallax" a proper definition will be found in the dictionary. This definition in the report applies only to those kinds of pumps where it is required to determine by the eye the amount of discharge. Now, if my amendment were adopted there would be no necessity of that. This does give particular recognition to sight-measuring devices. My point is that if positive stops are employed to determine the amount of delivery, the question of parallax is not so important.

Mr. Holbrook. The dictionary definition of "parallax" is of no assistance in this connection, because this amendment does not define "parallax" but attempts to give the interpretation of the conference as to what should be done to reduce parallax to a minimum.

Mr. Cummings. You admit that only applies to a sight-measuring pump.

Mr. Holbrook. I see your point. The interpretation only applies to those devices in which the quantities delivered are determined by bringing the liquid surface into coincidence with indicators, pointers, or graduations, which constitute the sole or most sensitive means of determining the amount of liquid discharged; that is true. But in so far as this specification recognizes those devices, they are recognized in many other specifications and you are not giving the devices any particular currency by again recognizing them here. If your amendment is considered at a proper time and adopted, it will

change several of our specifications, because several carry this same wording. Amendments would have to be made throughout the code wherever this wording occurs.

Mr. Flaherty. Mr. Secretary, is it your contention that this amendment which is up for adoption has no bearing on this positive stop question?

Mr. Holbrook. I do not understand your question. My contention is that Mr. Cummings's amendment is not germane to the question under discussion.

The Chairman. The Chair is inclined to rule that the substitute is germane.

A Delegate. Mr. Chairman, I would suggest at this time that if any members of the conference have any propositions to advance in the way of substitutions or amendments, they submit them in writing and permit all members to read them. I admit I know very little about the proposed amendment, or rather substitution, due to the fact that I could not hear the gentleman distinctly. These matters are of such importance that it is vitally necessary that we know exactly what they are.

(At the request of the chairman, Mr. Cummings reread his substitute amendment and then submitted the publication in which it was contained to the secretary.)

Mr. Holbrook. This publication in which this matter is printed is entitled "Specifications and Tolerances for Liquid-Measuring Devices (Adopted by the Massachusetts Association of Sealers of Weights and Measures)." Now, in this printed pamphlet this amendment now proposed to be made to specification No. 11 is not part of specification 11 at all. The specification numbered 11, in relation to "Parallax," is exactly the same as our present specification. This material is here included as specification No. 5–b. The gentlemen in Massachusetts did not consider at the time they adopted this specification that it was so related to parallax that it should be made a part of specification No. 11. They put it in another place.

Mr. Cummings. Mr. Chairman, that is five years old, and this seems the best method of substituting it at this point in section 11.

Mr. Holbrook. The suggested amendment does not seem to be properly a part of specification No. 11. If adopted, it should be an independent specification.

Mr. Austin. Mr. Chairman, it seems to me that this question is not germane, and I am sorry that Mr. Cummings has presented his suggestion at this particular time, since I think his amendment is a good one. I wish Mr. Cummings might see his way clear to withdraw his amendment, introduce it at some other place, and let the proposed amendment of the committee be carried, which I think is a very important one.

Mr. Flaherty. The Chair, I think, ruled that Mr. Cummings was in order in moving this as a substitute.

The Chairman. The Chair ruled that the motion of Mr. Cummings was in order.

Mr. Cummings. Mr. Chairman, if the committee deems it more desirable to have it considered in another place, I will withdraw my motion.

Mr. FLAHERTY. I will withdraw the second if it can be brought up in some other place.

The CHAIRMAN. It is entirely in order to resubmit it. We now have the amendment of the committee before us. The substitute has been withdrawn.

Mr. CUMMINGS. If there is no objection, Mr. Chairman, I move that the material which I have read be inserted after specification No. 5 and be numbered specification No. 5–a, to be nonretroactive.

Mr. FLAHERTY. I second the motion.

The CHAIRMAN. The motion is that the paragraph which Mr. Cummings has read be included in the specifications as No. 5–a. Is there any discussion?

Mr. HOLBROOK. Naturally the committee on specifications and tolerances has given this matter of sight-reading, visible-measuring devices a very great deal of consideration in their meetings. The committee does not believe that the present amendment as suggested by Mr. Cummings is opportune at the present time. There are many devices on the market which adopt this method of reading. The committee is familiar with some of them. There are doubtless some with which the committee is not familiar. Some of these devices may be bad. In those cases the operator is not able to deliver within the tolerances or the customer is not enabled properly to check the delivery made to him. Some of these devices may be good, in which case the criterion is that the operator is readily able to deliver quantities within the tolerances and the customer is enabled to check the deliveries made. I suggest that the remedy for that condition is plainly and satisfactorily given under the terms of the first paragraph of specification No. 7, which requires that all liquid-measuring devices shall be so designed and constructed that they can be readily operated to deliver each quantity for which a graduation, stop, overflow pipe, or other indicating means is provided within the tolerance provided on such amount.

In case a device can not readily be operated to deliver quantities within the tolerance, it does not comply with the present specifications adopted by this body. If devices are so designed and constructed—whether they be sight-reading devices or not—that they can readily be operated to deliver liquids within the tolerances and the delivery can be readily checked, then the committee is of the opinion that they should not, by one act of the conference, be eliminated from the market. At the present time, week after week, and month after month, new devices are coming on the market. It seems to your committee that now is not an opportune time to take a step like this. Your committee is fully advised of the difficulties encountered by the sealers, but believes there is already provided by the specifications a method of eliminating such improper pumps from use.

Mr. FLAHERTY. Mr. Chairman, Mr. Holbrook said he thought Mr. Cummings's amendment was a very good one and that it should be considered, and now that he does not think it proper to be considered at all?

Mr. HOLBROOK. I did not state that it was a very good one. I think it is one which may well be considered by the conference. The attitude of the committee is, however, that it should not be included.

Mr. Flaherty. The delegates here might have something to say about it before they get through with it. He objects to this amendment, and now I would ask where he would use the amendment.

Mr. Holbrook. I would not use the amendment at all at the present time. I am opposed to the amendment. I think it is perfectly proper for the chairman of the committee to state the conclusion arrived at by the committee.

Mr. Fuller. Mr. Chairman and gentlemen, this conference has a reputation to maintain—of fair and square dealing and of not adopting any regulation until there has been plenty of time to make a thorough and complete investigation of the matter in hand. I feel that this amendment in a great many ways is very drastic, and we should not take snap judgment on it, but should postpone it until such time as we can make a great many investigations in the field and be sure of our ground rather than to do something for which we might be sorry later.

Mr. Kelly. Mr. Chairman and fellow delegates, I feel as an inspector of weights and measures that when we depart from principles of common sense we are making a very great mistake. I also feel that when we quibble on some small technical matters in which the customers' interests are not taken care of 100 per cent we are also drifting a little bit away from the thing that we should do.

I would suggest that I am not attempting to pose as an authority on these gasoline pumps as described by these gentlemen. We have a few in our territory, a very few. But I do believe that on this committee on specifications and tolerances we have included men in whom the entire conference has, or should have, the utmost confidence. They are practical men of long experience and have given freely of their time in getting out these specifications.

I also feel that we should be very careful not to endanger the interests of any of the manufacturers. I do not believe that the manufacturers of scales and measuring instruments are second-story men. I believe they are working along trying to serve the public and trying to give everybody a fair and square deal. Of course, there will be some differences of opinion as to the value of the different devices. I do not believe any of us have expertness and experience and help enough to take care of all the problems that come before weights and measures officials, and I believe we should be very slow in adopting anything until we are absolutely sure that it is going to work out to the best interests of the consumer and to save the consumer from fraud.

Now, as I said before, this is a committee composed of men like Gus Schwartz; he is an old-timer and knows his business and has given considerable time to this. I think we should be very careful before we compel the manufacturers to make extensive changes in their apparatus.

Mr. Cummings. Mr. Chairman, there are a number of the pump manufacturers represented here to-day. They are all friends of mine, and I think all of them will tell you that the only reason they desire to make this sight-measuring pump is because the oil companies desire a cheap pump.

At the second last conference I attended, the committee reported an amendment to the specifications which would legalize the

2½-gallon stop on pumps. I opposed that at that time. It now appears that I was right. You do not see any 2½-gallon pumps being used to-day.

I have had as much experience, probably, as any man present. I have been in this work for 20 years. I have watched the development of the gasoline pump and I have tried hard to do justice to all the manufacturers with whom I have come in contact. I believe we will be doing justice if we can prevent them from taking a step which is bound to be corrected in the future.

The CHAIRMAN. Are you ready for the question? The question is on Mr. Cummings's amendment which has been read. Those in favor say "aye"; (after a pause) contrary "no."

(Apparently the majority voted "no.")

The CHAIRMAN. The "noes" appear to have it.

Mr. CUMMINGS. Mr. Chairman, I call for a hand vote.

The CHAIRMAN. The Chair will ask those in favor of the amendment to please rise. The secretary will count the number.

Mr. HOLBROOK. There are 16 in favor of the amendment.

The CHAIRMAN. Will those opposed to the amendment please rise.

(A number of delegates, considerably in excess of 16, arose.)

The CHAIRMAN. The Chair will declare the amendment lost. The question now is whether the amendment proposed by the committee to No. 11 should be accepted or not. This has been discussed in connection with the other. Are you ready for the question?

Those in favor of the amendment to specification No. 11 proposed by the committee will please give their assent by saying "aye," contrary "no."

The amendment is passed.

Mr. HOLBROOK. The next proposed amendment concerns specification No. 12. It consists in striking out the word "scale" in line 3. This does not change the meaning of the specification at all, but merely corrects a mistake in the copies which were printed.

The CHAIRMAN. If there is no objection, that modification will be accepted.

Mr. HOLBROOK. The next proposed amendment is to specification No. 22. It is proposed to strike out the following words in the first paragraph—

> In case such valve is used any other valve in any portion of the discharge line leading to this outlet must be so designed and constructed that it can only be closed off by the use of some tool or device which is outside of and entirely separate from the measuring device itself, such as a wrench, screw driver, etc., but not an adjusting pin.

and insert in lieu thereof the following:

> In case such valve is used any other valve in any portion of the discharge line leading to this outlet must be so designed and constructed that it can only be closed off in one of the following ways: (1) By the use of some tool or device which is outside of and entirely separate from the measuring device itself, such as a wrench, screw driver, etc., but not an adjusting pin; or (2) by the destruction of a seal. In case the latter construction is used means must be provided so that a seal of the usual lead-and-wire type may readily be employed to seal the valve open, and the manufacturer shall furnish his device with the valve sealed open; there shall be a metal tag or plate attached to the device adjacent to this valve handle clearly stating that the device should not be used unless the valve handle is secured by a seal.

The material in (1) is identical with the method required heretofore. The material in (2) proposes a new method of closing off the outlet. It is believed this will adequately prevent fraudulent manipulation and, at the same time, it is believed that this method will be in harmony with the underwriters' requirements in this connection.

The CHAIRMAN. If there is no objection, that modification will be accepted.

Mr. HANNA. Mr. Chairman, might I make a suggestion? We have a good many different States which interpret these specifications. Whenever necessary to place a sign upon the pump, it might be of benefit if the code could suggest a size and type of sign, as well as a uniform wording, so that we would not be required to put a small sign on in one State and a billboard in another State.

Mr. HOLBROOK. The next proposed amendment is to specification No. 26. This specification is largely of academic interest at the present time, because computing pumps are but little known. However, this may be of great use in guiding manufacturers who desire to develop such devices. It is proposed that the specification be amended to read as follows:

Specification 26. When liquid-measuring devices are equipped with money-value computing charts these shall be made in accordance with one of the following principles:

(*a*) If the device is so designed and constructed that it purports to compute for one or for a series of unit prices the total price for every delivery within the range of the device, then the device shall be equipped with a value pointer or indicator and value graduation marks; the value graduation marks shall be correctly placed; and in any position which the indicator or pointer and the chart may assume there will be exposed to view a sufficient number of value figures and graduations to permit the value indications of the device to be read correctly. The value graduations shall not exceed 1 cent at all prices per gallon up to and including 30 cents. At any higher price per gallon the value graduations shall not exceed 2 cents: *Provided, however,* That nothing in the above shall be construed to prevent the placing of a special value graduation to represent each 5-cent interval. These special graduations may take the form of dots, staggered graduations, or similar forms. They shall be so placed that their meaning and value may be clearly understood, but they shall not be placed in the space between the regular graduations.

Up to this point the requirement is substantially identical with the present requirement. The following paragraph presents a new method of construction, which is very similar to the present requirements for linear-measuring devices. [Reading:]

(*b*) If the device is so designed and constructed that it purports automatically to compute only for deliveries corresponding to a definite series of quantity graduations, then one of the following alternatives shall be complied with: (1) There shall be a value computation for each quantity graduation throughout the range of the device; or (2) no value indications may be exposed to view except at such times that the device registers a quantity indication for which a correct value indication is provided; or (3) each value graduation or each column or row of such graduations shall be clearly and conspicuously marked with the quantity graduation to which the value corresponds, and the device shall be marked with the character and limitations of the computations made. All money values corresponding to definite quantity graduations must be mathematically correct except as follows: If the mathematically correct amount includes a fractional part of a cent, the fraction shall be dropped if it is less than one-half, but if the fraction is one-half or more the next higher cent may be shown.

The CHAIRMAN. If there is no objection that modification will be accepted.

Mr. HOLBROOK. It is proposed that specification No. 27 be amended to read as follows:

Fraudulent construction prohibited.—All liquid-measuring devices and all devices designed to be attached thereto and used in connection therewith shall be of such design and construction that they do not facilitate the perpetration of fraud.

This is considered to be a much better and simpler wording. The meaning is not changed in any degree.

The CHAIRMAN. If there is no objection that modification will be accepted.

Mr. HOLBROOK. This identical specification is included in all of our codes of specifications. We consider this language is very much simpler and there is no change in meaning.

May we have a vote of the conference authorizing this same change in the wording of all our codes to keep them uniform?

(A motion was made that the amended wording also be included in the other codes of specifications, the motion was seconded, the question was taken, and the motion was agreed to.)

Mr. HOLBROOK. We now suggest that one item be included under the heading "General notes." The committee recommendation is as follows:

Specifications Nos. 6 and 11 as amended shall not be put into force and effect prior to July 1, 1927, and thereafter shall be nonretroactive in effect.

Those are probably the only ones which will require extensive alterations in present construction, and it is considered that it would be an injustice to the manufacturers if sufficient time were not granted them to make the changes and dispose of the stock on hand.

The CHAIRMAN. If there is no objection, that will be included.

The question now is on the adoption of the report in its entirety.

(A motion was made that the report be accepted as a whole, the motion was seconded, the question was taken, and the motion was agreed to.)

(At this point Mr. Warner, second vice president, assumed the chair.)

Mr. MARONEY. Mr. Chairman, I do not believe there is any motion before the house. I therefore move you, sir, that the committee on nominations be ordered to report at once.

(The motion was seconded, the question was taken, and the motion was agreed to.)

REPORT OF COMMITTEE ON NOMINATIONS, PRESENTED BY WILLIAM F. CLUETT, CHAIRMAN, AND ELECTION OF OFFICERS

Mr. Chairman and delegates, your committee on nominations having met, respectfully submits the following names of members of the conference as nominees for officers and members of the executive committee for the ensuing year:

President, George K. Burgess; first vice president, George Warner; second vice president, J. Harry Foley; secretary, F. S. Holbrook; treasurer, George F. Austin; members of the executive committee, all of the officers ex officio, Fred Benjamin, W. F. Cluett, W. A. Dalziel, H. N. Davis, Thomas Flaherty, H. L. Flurry, William

Foster, W. F. Goodwin, T. F. Mahoney, E. J. Maroney, I. L. Miller, G. B. Nebinger, W. A. Payne, B. W. Ragland, G. M. Roberts, A. W. Schwartz, W. F. Steinel, W. F. Swoger, W. E. Thompson, and H. A. Webster.

(Signed) W. F. Cluett, *Chairman*,
George Warner,
J. J. Cummings,
S. T. Griffith,
J. G. Rogers,
Committee on Nominations.

The Chairman. I believe it is customary to call for nominations from the floor, if there are any, for any of these offices.

Mr. Maroney. Mr. Chairman, I move that the nominations be closed and that the secretary be instructed to cast the ballot of the conference for all of the nominations as read.

(The motion was seconded, the question was taken, and the motion was agreed to.)

(Accordingly, the secretary cast the ballot of the conference for the officers and members of the executive committee, as nominated by the committee on nominations, and they were declared duly elected.)

REPORT OF THE SPECIAL COMMITTEE ON METHODS OF SALE FOR ICE CREAM, PRESENTED BY A. W. SCHWARTZ, CHAIRMAN

In accordance with the resolution adopted at the Eighteenth National Conference, owing to the fact that but little discussion was accorded the papers submitted on the subject "Shall ice cream be sold by weight?" your committee appointed to gather data for the purpose of presentation at the Nineteenth National Conference for a possible solution of the problem now confronting weights and measures officials, manufacturers, and retailers beg leave to report that they have given the subject considerable attention and present the following for further consideration and discussion.

The papers submitted by the representative of the New Jersey State Department of Weights and Measures advocating the sale by weight of ice cream, the viewpoint of the manufacturer, the viewpoint of the retail dealer, the report of the work in relation to ice cream of the joint committee on food definitions and standards, the present regulation of sale of ice cream in Wisconsin, and the remarks by the representative of the National Association of Ice Cream Manufacturers were presented at length and are to be found in full in the proceedings of the Eighteenth Conference.

Your committee has endeavored to secure data other than presented last year, but find that there are but three States—Ohio, Kansas, and Wisconsin—that have laws or regulations governing the sale of ice cream. The two former States regulate the sale in so far as the wholesaler is concerned; the latter deals only with the percentage of overrun to be allowed. None of these laws regulates the sale by the retail dealer; and in consequence the committee has been unable to secure concrete information as to the practical operation of a sales-by-weight law.

Your committee carefully reviewed the arguments advanced at the Eighteenth National Conference by both the proponents and opponents of the sales-by-weight proposition and are divided in their opinion as to the proper method to be used for a satisfactory solution of the problem.

The committee is unanimously agreed that there should be regulation governing the overrun in the commodity and that there is considerable loss to the retailer in selling from bulk, even under the most favorable conditions.

Your committee recommends that the conference go on record favoring such legislation as will establish a legal percentage of overrun.

The committee is, however, divided upon the matter of sale by weight, the majority being of the opinion that volume is the more practical, economical, and sanitary method, while the minority member still holds that the only solution of the problem is sale by weight, as it would permit a definite, satisfactory determination of quantity.

Therefore, your committee recommends that the matter of sale by weight or volume be disposed of by a vote of the conference.

(Signed) A. W. Schwartz, *Chairman*,
George Warner,
William Foster,
Special Committee on Methods of Sale for Ice Cream.

DISCUSSION OF ABOVE REPORT

The Chairman. The question is on the disposition of the report.

Mr. Maroney. Mr. Chairman, I move that the report be tabled for a year. There has been and is an evolution going on throughout the ice-cream industry and there is talk of dropping the use of gas in obtaining the overrun and using air. In view of the fact that the manufacturers are still undecided as to what method to pursue and also since the committee itself can not agree, I believe the matter should be tabled for at least a year.

The Chairman. Is the motion seconded?

(The motion was seconded.)

Mr. Schwartz. Mr. Chairman, I think the report should be received and then, if you wish, let action be deferred for a certain period. The committee recommends that the conference go on record with one recommendation that we are unanimous on—that a maximum percentage of overrun should be fixed by proper authority. Of course, that may not have anything to do with weights and measures, but it is a step nearer a satisfactory solution.

On the other proposition the members of the committee could not agree. We were divided; it was two to one, and I had to stick to sales by weight, because I believe that is the proper thing. And while personally I have no objection to a delay and an effort to get more data if it is possible, yet I think the report of the committee should be acted on one way or another.

Mr. Foster. As a member of the committee I would state that while I am perfectly satisfied with any disposition that the conference sees fit to make with the report of the committee, it seems to me

you overlook the fact that we ask action by the conference on the proposition of overrun and recommend that some legal regulation should be made in that respect. The committee was unanimous on that point.

REMARKS OF THOMAS HALL, REPRESENTING THE NATIONAL ASSOCIATION OF ICE-CREAM MANUFACTURERS

Mr. Chairman, ladies, and gentlemen: The question of marketing ice cream has received a great deal of attention during recent years, particularly by manufacturer and retailer. Present prices and equipment make the business profitable only on the basis of quantity production. If prices to the consumer are too high, consumption will be curtailed. To survive, the manufacturer and retailer must produce and sell at a price which the public is willing to pay in comparison with other foods and delicacies which attract the appetite. The margin is narrow, not as some would have you think. I feel sure that Government records on income tax would show that the ice-cream manufacturers are not making more than the average of other industries. Such things are automatically regulated; when any line of business becomes very profitable, many get into it and competition soon adjusts profits to a normal basis. If those who have made exaggerated statements of profits in the industry due to volumes of air content can prove their statements, it will be an easy matter to get capital and jump into the inviting waters. There will be no lack of stock available at reasonable prices. There are something like 4,500 wholesale manufacturers in the United States, and competition is keen.

Manufacturers and experts in recent years have done a great deal of experimental work, and spent much money in an attempt to solve their problems in the manufacture of more uniform and better ice cream. Improvements are, as a rule, for the good of all concerned. A scan of ice cream journals and annual reports of proceedings by State and National societies in the industry clearly show and prove this. Dealers' and consumers' interests are carefully considered; charging the industry with such statements as the "Public pays millions of dollars for air," are manifestly unfair to say the least. The industry believes you officials are honest and we desire to work with you in the developing of fair and reasonable standards. Industry benefits and is protected by proper regulatory laws. We do oppose sale of ice cream by weight because we believe it detrimental to manufacturer, retailer, and consumer. Those who advocate such sale we feel sure are few, whether they be official, manufacturer, retailer, or consumer.

It is a good rule never to make changes unless markedly for the better. We should not have a selling-by-weight law unless it will be much better than present conditions. The utmost care should be taken in the enactment of food laws, taking into account all basic facts.

Weight is a very poor measure of value in ice cream, because it takes no account of, and does not coordinate with quality. It seems like going into a jewelry store and asking for a pound of watches regardless of value.

It is said we have regulatory laws on quality and sanitary characteristics, but nothing on quantity. Laws pertaining to quality and also to sanitation are in terms of minimum limits; why not the same for quantity, as in the case in the Ohio and Wisconsin laws? The Ohio law states that a gallon of ice cream shall not weigh less than 4¼ pounds. The Wisconsin law states that a given volume of ice cream when melted shall show as least half that volume. The Wisconsin law means that 100 per cent overrun is the limit, while the Ohio law means about 111 per cent as a limit.

It has been stated that the manufacturer can easily control overrun. This is not true. I think I am safe in saying that to be safely inside the Wisconsin law we would aim at not over 80 per cent, and with the Ohio law 85 to 90 per cent. Either is a good ice cream. Personally I favor the Ohio law for several technical reasons. It will catch the few who use too much air and help the industry as a whole. It does not increase the cost of manufacture and delivery as sales by weight would.

If the point of sales by weight is the quantity delivered to the dealer, then I do not see where it benefits him. As I see it, natural laws will control. The retailer now gets some light and some heavy cans, but at the end of the week when he pays his bill they average up to the same weight and total as if sold to him by weight. He therefore had the same amount of cream to sell in either case. In fact, the manufacturer would have to charge him more, because of the increased cost of sales by weight, unless the manufacturer absorbs the extra.

A limit law does not mean that the manufacturer is going to float just along the border line. The butterfat limit in Pennsylvania is 8 per cent; many make 12 per cent.

Manufacturers are very desirous of producing a uniform overrun product and are making some progress, though as yet far from satisfactory. Cream is frozen in batches and is very susceptible to changes of overrun. Much time and money have been spent in an attempt to develop satisfactory continuous-flow-process freezers, not yet successful.

Ice cream is very different from other substances, which difference makes manufacture and sale by weight impractical. Cans vary greatly in weight. The weighing, marking, or tagging of cans, and the necessary frequent inventorying of stock are not practical. Heavy cans of ice cream will be rejected by the dealer because he can not dish out as large appearing quarts. People buy and select foods largely by the eye. The big, clean, attractive looking article is the thing that counts. Consumers will object to packages not being full. It is impractical to sell package ice cream by weight. The extra time required by manufacturer and retailer to sell ice cream by weight is objectionable. It is impossible to manufacture, dispense, and sell all ice cream by weight, and it is not workable to have a double law. It is not possible to give here in the limited time all of the many objections to sale by weight. No State in the Union has laws compelling the sale of ice cream by weight, and I do not believe this body will advocate it after considering all the facts.

Ice cream would not be ice cream if it did not contain air, any more than bread would be bread without air. It is an essential part

of good ice cream. Manufacturers and retailers are now permitted to sell ice cream by weight if they so desire. Few retailers desire to sell by weight. Selling ice cream by weight was considered in California, regarding which Charles G. Johnson has this to say:

Upon learning you will have a hearing on matter of defining proper butterfat and weight standard for ice cream and thinking my experience and investigations into questions as former superintendent of weights and measures in California extending over considerable period might be of assistance, can assure your committee that after spending over one year making investigations with assistance of all prominent dairy and food officials in California we found that fixing a weight standard for ice cream entirely impracticable and abandoned any attempt to introducing regulations for such enforcement.

Upon inquiry of the California Southwestern States Ice Cream Manufacturers Association in regard to experiences of retailers selling by weight, the following telegram was received:

Only California retailers who tried selling by weight were druggists in Los Angeles and vicinity who abandoned idea three years ago. Too much trouble explaining to public why containers were not packed full. Several arrests for slack-filled packages. Idea not popular with public. Dealers convinced of impracticability as demonstrated in tests by officials State department of agriculture and dairy division, University of California.

Retailers are in sharp competition on practically all articles they sell; some purposely pack overfilled quarts, others sell at too low prices for satisfactory profit. Some insist on keeping their ice cream too soft. Temperature is a much greater factor in dipping ice cream than overrun.

It has been stated there is no profit in selling ice cream; when properly handled I doubt if there is any other food product with more. Professor Judkins, of the Massachusetts Agricultural College, after making an exhaustive investigation of retailers, by purchasing from many retailers a large number of quarts and pints, finds the average profit 33.7 per cent on the purchase price.

In spite of putting in a number of iceless cabinets, the company with which I am connected find that the ice used per gallon of ice cream has in three years gone up from 26 pounds to 44 pounds and the salt from 3.6 pounds to 6.5 pounds, due to the demands of the retailer. We are asked to do much more than simply make his cream. There is much need of greater cooperation between manufacturer and dealer with a view to reducing costs.

There is a well-recognized variable shrinkage in the dipping of ice cream which can not be wholly avoided. This is also true in other food products, which is allowed for in the selling price.

The National Association of Ice Cream Manufacturers stand ready to help to give all available information regarding the industry, and to cooperate with public officials in sound regulatory measures based upon facts.

Mr. Kelly. Mr. Chairman, since the last conference I have made a sort of investigation of the ice-cream problem. I do not mean I have gone into it quite as extensively as the gentleman from New Jersey, but I was interested in the development and I took it upon myself to go through several ice cream manufacturing plants in my town. The impression I gained was that the manufacturers can control this overrun to a certain extent by machines, with which they can gauge the percentage of overrun and the weight per gallon.

And I also found out from an investigation that these men, if it were possible to handle ice cream by weight, would be very glad to do it. But we do know that this particular product is something that can not be controlled in the usual way—in other words, this air, which Mr. Schwartz has been objecting to, is a very necessary constituent.

I found the manufacturers were not so much opposed to regulation—they thought if there was a certain amount stipulated for the overrun that it would be perfectly satisfactory. I was given to understand that those creams which have a large percentage of overrun were inferior grades, and those who manufactured ice cream and tried to keep their product up to a high standard were opposed to the suggested sale by weight inasmuch as the cheaper creams with greater overrun would have a larger volume per pound. I think the committee's report, as far as establishing a maximum of this overrun, should be taken notice of at this time and that the question of sale by weight should go over for another year. I would be in favor of something that would establish a minimum at about 4½ pounds per gallon.

Mr. MILLER. Mr. Chairman, I do not know whether a motion is in order, or not?

The CHAIRMAN. The motion before the house is to defer action until next year.

Mr. MILLER. I wish to offer this substitute motion: That the committee report be accepted and that a copy of this report be submitted to Dr. W. W. Skinner, of the Bureau of Chemistry, chairman of the committee on food definitions and standards, which committee has under consideration at the present time the subject of the limiting of overrun of ice cream; and that action on the question of sale by weight or measure be deferred until next year.

(The motion was seconded.)

Mr. MARONEY. I will be glad to withdraw my motion.

Mr. FLAHERTY. I withdraw my second to the motion.

(The question was taken, and the motion was agreed to.)

TESTING METHODS AND TOLERANCES FOR PORTABLE DEVICES DESIGNED FOR DETERMINING THE AXLE LOADS OF LOADED TRUCKS ON HIGHWAYS

REMARKS OF COL. I. L. MOLLER, TRAFFIC DEPARTMENT, DISTRICT OF COLUMBIA

Mr. Chairman and members of the conference, in traffic regulation throughout the United States it becomes necessary to use certain devices for weighing loaded motor trucks. The devices for this purpose must necessarily be of a small and portable character in order that the officers may carry them around with them in their motor cycles, as it is many times the case that the officer observing a loaded truck will be a long distance from a platform scale. Throughout the country the same situation prevails, and it is difficult to find a platform scale conveniently located for the testing. Here in the District of Columbia we are up against the same proposition—we have not the platform scales. We are, therefore, obliged to use these small portable devices; they only weigh about 43 pounds apiece and a pair of them can be carried around by a motor-cycle officer in a

side car. We have found, however, that when we take a case into court we are in trouble right away, because the defendant is represented by an attorney who knows his business, and he asks if they have been sealed by a sealer of weights and measures, and we must say they have not been sealed.

It is very necessary that we should know the weight of the traffic passing over the various State highways, so that we may know how the State highways should be designed and built to stand up under the existing traffic. The same condition, of course, prevails in the District of Columbia.

There have been reasons why these scales could not be properly tested; there have been many new developments in these devices. Our experience with the latest models—and I believe that experience is borne out by recent tests of the Bureau of Standards—leads us to believe that the stage is now reached when it would be perfectly proper for these portable instruments to be sealed officially.

We find now when we stop a truck on the street and weigh it that before taking that case into court we are obliged to make a reweighing on a platform scale. The agreement between the weights over the portable devices and over the platform scales is very close, indeed. The day before yesterday I noticed one case where the weight on the portable scales was 25,000 pounds. We checked it immediately on a platform scale and we got 24,915 pounds, a difference of only 85 pounds. But these portable scales are not constructed so that they can be used for weighing butter and eggs and such stuff. They are graduated on the dials for 100-pound readings. We can read them very accurately within 25 pounds, but they are not designed for weighing light loads.

The other afternoon I had occasion to get a weight on a big vehicle, a new type of truck of which they wanted to establish the weight. The truck was weighed on five different platform scales within two hours, being taken from one to the other. One scale showed 9,750; the next time we got 9,900; on the next 10,000; and the next two scales reported 10,200, which shows that platform scales are not always absolutely accurate to a pound.

I am under the impression that platform scales are as a usual thing not guaranteed down to the pound but are tested within certain tolerances, and I believe it is practicable and proper at this time for the sealers to recognize the importance to the officials, municipal, county, and State, of these portable weighing instruments in order that they may be used as evidence in court in maintaining the highways of the States in proper condition. The overloaded truck is a very, very serious problem nowadays. Many States, in fact every State in the Union, has a gross-weight limitation on loads which is based in the majority of cases on what the highways of that State are capable of standing up under and what is the greatest load that can be moved at a reasonable maintenance cost of such highways; and unless the highway officials and the traffic-enforcement officers have some means of enforcing the regulations it will cost millions of dollars in road repair.

I think if this conference will give consideration to these portable scales with a view to arriving at some conclusion by which they

can be reasonably sealed within certain tolerances, it will be of inestimable value to officials all over the country. We have no desire to get down to a few pounds limit; we do not arrest a motor-car operator if he has a 200 to 300 pound overload; we believe in being reasonable. It is not possible to load a truck under a steam shovel to the exact pound, and the difference in loading may vary greatly. We believe 5 per cent excess may reasonably be allowed before a case is taken to court.

I do hope that in the interests of the preservation of the streets of the cities and towns and of the highways all over the United States, this body will take some action in order that we may enforce the law.

Mr. Dalziel. Mr. Chairman, I would like to say that for two years past in the State of Oregon we have been inspecting and sealing the devices used by the highway department in testing out the loaded trucks on the highways and we allow a tolerance of 100 pounds; as far as their provisions are concerned I understand that the highway department is not particular within 200 to 300 pounds. We put on lead seals, and I do not believe they have lost a case in court. They rely on that seal as showing that the scale is correct. We also give the traffic department a certified copy of a report to the effect that we have tested the scale on such and such day. This plan is very satisfactory.

Mr. Bulson. It might be of interest to the conference to know how I worked out a solution for the testing of these scales used in testing trucks on State roads. There was a pair of them brought to me by the State police for checking up. I found in the city of Watertown there was a traveling crane on which they had weights from 100 to 1,000 pounds. These weights were set on a platform scale that was tested and found to be within a reasonable tolerance. Then by use of the traveling crane we applied these loads—built up the load on each scale separately. It was a kind of a ticklish job to get those 1,000-pound weights exactly balanced, but we succeeded in doing it and we went to three-fourths of the capacity of the scale, although we could not find any regulations governing it. The scales I tested had 100-pound divisions, and the results were very close; they were well within 100 pounds. I approved the device in the absence of further information, and I have had no requests or disputes in regard to it.

REMARKS OF H. M. ROESER, BUREAU OF STANDARDS

The formal practice in courts handling cases in which overloading of vehicles is charged requires that testimony concerning the actual weight of the vehicle be of unquestioned accuracy. However, design requirements of the weighing machines from which such testimony is secured inevitably place mechanical limitations upon the degree of accuracy which may be obtained. Again, the conditions of use are severe, and the mechanical limitations of the design are such that rough usage is likely to result in variations in the weighing performance. Apparently, however, the machines in common use show as much promise as can be expected when all the circumstances are considered, and since the protection of highways from de-

struction is a vital economic necessity, it is incumbent upon all concerned to follow the dictates of common sense and engineering experience in the enforcement of vehicular weight-regulation. In short, a weighing machine need not be absolutely accurate, if it in fact be accurate enough. Neither need it be immutable in performance if its variations are small and reasonably convenient to determine.

The accuracy obtainable in machines for weighing individual wheel loads is limited by the requirements of portability and compactness. The substantial foundation and combination of levers which would be required in an ordinary commercial scale to weigh loads of 10,000 to 20,000 pounds must be reduced to a form of such size and weight that it can be conveniently carried about, and this practically eliminates the reducing-lever principle of force measurement. In fact, it is necessary to work into the design principles of force measurement which could not be considered in commercial weighing machinery and these principles are the accuracy-limiting agents.

The end sought in the design of all measuring machinery is that measurement shall be done close enough for the intended purpose. Absolute accuracy of measurement of wheel loads of vehicles is no more necessary than it is in any form of commercial measurement where it is never hoped to be attained. As a matter of fact, it is less necessary, because the consequences of inaccuracies are of less importance. A 5 per cent overweight on a bill of goods would be unconscionable, not only because of the economic hardship upon the seller, but also because in the present state of development of commercial weighing machinery there is no excuse for it; whereas, aside from the fact that a 5 per cent overload on a motor truck may be considered only a technical violation of a police regulation, the additional destructive effect on highways of a load 5 per cent in excess of the weight limit set by the regulations, as compared with a load of maximum legal weight, is undoubtedly slight.

The opinion of the bureau, after a number of tests of these machines under various conditions and a rather complete study of their design, manufacture, and quality of workmanship, is that under ordinary conditions of use the machines can be depended upon to yield results within a degree of accuracy better than 5 per cent and probably better than 3 per cent. However, it is advised that the conditions of use be rigidly and competently supervised, and that the performance be frequently checked.

Owing to their compactness the customary method of testing scales by placing standard weights on the load-receiving element is impracticable to apply to portable wheel-load weighers. A not unusual method of checking the performance of these machines is to place them in an ordinary materials-testing machine of suitable capacity. This sort of test is considered by the bureau to be unsatisfactory for the general reason that the errors or variations in the testing machines are likely to be of the same order or greater than those in the weighers, and, further, because perceptible variations can be produced by different methods of operating the testing machines.

There is, however, a simple, convenient, and extremely practical method of test, and it is not believed that the possibilities of elimina-

tion of variations due to testing technic can be improved. This method consists simply in laying a pair of weighers on the deck of a motor-truck scale whose accuracy has previously been authentically established, balancing them out on the weigh beam, driving a pair of wheels on the weighers, and comparing the weight indications of the weighers with that indicated by the scale beam. This procedure can be carried out with both the front and rear wheels of a truck which will check the machines at two points in the capacity range. Other points can be checked by varying the load on the motor truck or by weighing different trucks. In the official testing of these weighers by the weights and measures officer the load should be carried up to the maximum which it is anticipated will ever be encountered in the course of the use of the weighers by the highway inspectors, and, of course, a number of other observations should be made at lesser loads so that the machines may be tested throughout the range in which they will be used. For daily or weekly tests on the part of the highway inspectors themselves, checking two points in the weighing range will probably be sufficient.

In this connection it may be added that as far as accuracy or dependability of performance is concerned a well-designed, modern motor-truck scale as a force-measuring machine is capable of producing superior results to machines used in engineering laboratories for testing the strength of materials. Further, when using a motor-truck scale as described above, the factor of making tests under practical conditions of loading is involved, which, as a matter of principle, is much desired. It should also be pointed out that, for purposes of testing the machines, the fact that the wheels of the loaded truck are raised slightly above the scale platform by reason of the interposition of the portable weighers introduces absolutely no discrepancies, since the test consists merely of comparing the indications of the weighers and of the scale beam when both are subjected to the same loads, whatever these may be.

Care should be exercised in the use of portable wheel-load weighers that they be laid on a surface as nearly level as possible, and in testing or use they should be so alined that the wheel loads are applied in the centers of the platforms. They should be protected from falls and, in fact, generally treated with extreme care. The gauge indicator is susceptible of damage from rough treatment, and the whole machine should be returned for repairs at any sign of failure in the gauge or elsewhere.

It is to be emphasized that the practice of establishing corrections to be applied to the weight indications of portable weighers should not be followed. A reasonable range of variation should be established and the manufacturers required to maintain the machines within these limits. The numerical values of suitable tolerances is, I believe, to be the subject of a report by your committee on specifications and tolerances. This policy is desirable from the point of view of administering overweight regulations, and modern business standards are such that the manufacturers of the machines should not object to providing reasonable and competent maintenance service. In order to guard against possible misunderstanding, the rather obvious point might be interjected here that in following the policy just outlined, in the event of an indicated overload less than the

established allowance for variation, there can be no positive assumption that the vehicle is overloaded at all.

Finally, let it be said that the common tendency to expect these machines to compare in performance with commercial weighing machines has no justification. They are not commercial weighing machines nor are they used for any of the purposes for which commercial weighing machines are used. Their intended function is to establish a degree of probability as nearly certainty as may reasonably be attained, that a vehicle is or is not loaded in excess of prescribed limits, and to do this there is no essential reason why they should compare in performance with commercial weighing machinery.

REPORT OF COMMITTEE ON SPECIFICATIONS AND TOLERANCES, PRESENTED BY F. S. HOLBROOK, CHAIRMAN

The committee on tolerances and specifications brings in the following report, which has been distributed, in relation to these devices:

NOTE.—These devices are designed and constructed solely for official use in the enforcement of traffic or highway laws, and when sealed by the weights and measures official they are sealed for the above purpose only; they are never to be allowed in commercial use.

Tolerances.—The tolerance to be allowed in excess or deficiency on portable devices designed for determining the axle loads on loaded trucks on highways shall be 5 per cent in excess or deficiency of the load applied: *Provided, however,* That the manufacturers' tolerance or the tolerance on all new devices shall be 3 per cent in excess or deficiency of the load applied: *And provided further,* That this latter tolerance shall also be applied to all devices which are being retested after being found incorrect and subsequently adjusted or repaired. When the devices are tested in pairs the above tolerances shall be applied to the sum of the indications of the two devices and both shall be approved or condemned upon the sum of their indications; in this case each of the pair of machines shall be appropriately marked to identify the pair tested together.

(Signed) F. S. HOLBROOK, *Chairman,*
W. F. CLUETT,
A. W. SCHWARTZ,
C. M. FULLER,
I. L. MILLER,
Committee on Specifications and Tolerances.

Mr. HOLBROOK. In our understanding this is a reasonable tolerance for the machines and is satisfactory to the various parties in interest. I move it be adopted by the conference.

(The motion was seconded, the question was taken, and the motion was agreed to.)

ANNOUNCEMENT CONCERNING SEVERAL PROPOSED PUBLICATIONS OF THE BUREAU OF STANDARDS

Mr. HOLBROOK. Last year the conference adopted a resolution requesting the Bureau of Standards to consider the practicability of a correspondence course of a practical nature for the benefit of weights and measures officials. The bureau has been giving very serious consideration to that and believes that method of procedure is impracticable. However, as you know, the bureau is always anxious to assist you in your work and an effort was made to solve the problem in some other way.

It is now proposed by the bureau that three publications be prepared and issued to assist you in your work, these publications to be in handbook style and to replace Handbook No. 1 of the Bureau of Standards, entitled, "Manual of Inspection and Information for Weights and Measures Officials." It is proposed that these three will be a substitute for that one, the supply of which is now nearly exhausted and the contents of which are out of date in many respects.

I have distributed to you the tentative tables of contents of these three proposed publications. The first, to be known as "Weights and Measures Administration," is intended to present a general picture of what weights and measures supervision is, and to lay the groundwork of fundamental knowledge essential to a proper understanding of the duties of the weights and measures official.

The second publication, "Weights and Measures Technology," is designed as a weights and measures textbook for the official and for others engaged in testing weighing or measuring equipment, and is intended to present in easily understood form the essential principles of operation and construction, and methods of inspection and test, for different classes of weighing and measuring instruments.

The third publication, "Specifications and Tolerances for Weighing and Measuring Devices," will be primarily a compilation of the various codes of specifications and tolerances adopted by the National Conference on Weights and Measures, and recommended by the Bureau of Standards.

I will not attempt to read the detailed tables of contents, but you have them before you for your consideration. I have taken this matter up with the editorial committee of the Bureau of Standards and the committee states that, perhaps, money can be found within the next year or two years to publish these handbooks which have been suggested here. What we are particularly anxious to find out at the present time is if the publications proposed will meet your needs. We also desire to find out whether you have any suggestions as to the tables of contents. It seems that the latter question might be answered by mail when you get home and have more time carefully to consider them; the bureau invites statements from the weights and measures officials as to whether in their opinion some of this material might be deleted or whether additional subjects should be considered in the publications. But if we may have a vote of the conference at the present time as to whether the three handbooks would be of use to you, we would be better able to go ahead with their preparation.

Mr. Griffith. Mr. Chairman, I move that it is the sense of this conference that it is desirable to proceed along the lines suggested by Mr. Holbrook.

(The motion was seconded, the question was taken, and the motion was agreed to.)

DISCUSSION CONCERNING SPECIFICATIONS AND TOLERANCES FOR BABCOCK GLASSWARE

Mr. Holbrook. The committee on specifications and tolerances desires information with reference to the attitude of the conference on Babcock glassware. On the first day of the conference there was a

paper presented by a representative of the Department of Agriculture describing and demonstrating the butterfat test for milk and cream, and in this test the Babcock bottle was employed. The apparatus involved in the tests of milk and cream consists of butterfat test scales and Babcock bottles and some other apparatus.

Some time ago the conference adopted specifications and tolerances for butterfat test scales, but the conference has never considered the subject of Babcock glassware. Now it is recognized that these types of apparatus are sometimes used in determining the quality of the milk and cream to ascertain whether they conform with prescribed standards, and for these purposes our health authorities or our pure-food authorities are in entire control. In other words, in respect to these uses the butterfat test scales and the Babcock bottles and pipettes are of no concern to the weights and measures officials unless, perhaps, they are requested to test their accuracy. However, there is another very important use for these types of apparatus since it is to be remembered that a very large commerce exists in this country in buying and selling butterfat in the form of milk and cream. If the butterfat scale is not correct or if the Babcock bottle is not correct, the amount of fat purchased or sold in the form of milk or cream will be improperly determined and an unjustifiable gain or loss will result, just as surely as in the case of any other incorrect weighing or measuring apparatus, and this gain or loss may be a very important one. This character of use of these types of apparatus may bring them squarely within the jurisdiction of the weights and measures official, depending upon the laws of the various jurisdictions.

Now, it seems that in order to make our codes of specifications and tolerances in regard to commercial apparatus complete, the Babcock bottle may well come in for consideration; however, your committee is a busy committee and we do not desire to do work just for the happiness which we feel in the work which we do. Unless specifications and tolerances would be of practical use to some of you, we would prefer not to proceed. Therefore we desire to ask you whether you test Babcock glassware at the present time: if not, whether you have been requested to test Babcock glassware or whether in your opinion a necessity exists that would make it advisable for you to inaugurate the testing of Babcock glassware?

If there are a number of jurisdictions, or even several, interested in this subject, the committee on specifications and tolerances will endeavor to bring in specifications and tolerances for Babcock glassware at the next conference. However, if no demand exists it probably will be unnecessary to do so. If we can have an expression of the conference on that subject, we will be assisted in planning our future work.

Mr. Estes. Mr. Chairman, for the information of the committee, may I state that in Michigan the testing of Babcock glassware is done by the State bureau of dairying, which tests each and every bottle submitted by the manufacturers, and these bottles are controlled within specified tolerances. These bottles, when found correct, are marked "SGM," which means standard glassware for Michigan. That takes it out of the hands of the sealers and puts it

in the hands of the bureau of dairying, which is very well equipped for testing.

Mr. CUMMINGS. The laws of the State of Massachusetts specifically require that this apparatus be tested.

Mr. THOMPSON. Mr. Chairman, while our dairy department in Minnesota does some of this work, they have not at hand facilities to go into the accuracy of the Babcock glassware or pipettes as a state-wide proposition. They are asking the department of scales, weights, and measures to assume that duty. Under our law we have the authority. We have a laboratory for that purpose and would like to proceed with it, working very closely in conjunction with our dairy and food department. It is of vast importance, and we would recommend a specification on the subject.

Mr. ROGERS. The State of New Jersey looks at it the same as Michigan. We do not test Babcock glassware in our State department. It is all done by our agricultural experimental station at New Brunswick.

Mr. WARNER. Mr. Chairman, I would like to state for the benefit of the committee that in Wisconsin, which is a great dairy State, the testing of Babcock glassware was one of the first activities undertaken when the weights and measures department was organized. Our present law is modeled very closely after the milk bottle law as recommended by this conference; that is, all manufacturers of Babcock bottles and pipettes file a bond and are given a serial number. We find that it is not a very difficult matter to test test bottles or pipettes. It requires very little apparatus and the main requirement is time; and if the industry is important enough in a State, I think it is a very important activity.

REPORT OF TREASURER, GEORGE F. AUSTIN

GENTLEMEN: I herewith submit my report as treasurer of the National Conference on Weights and Measures for the year ending May 24, 1926.

Receipts:		
Balance on hand May 24, 1925		$147.95
Received through fees from delegates		89.00
Total receipts		236.95
Disbursements:		
Ralph Smith, as per bills, theater tickets	$98.60	
Flowers in memory of Louis S. Fischer	10.00	
Candy for stenographers	10.00	
Cigars for official reporter	10.00	
Badges	5.00	
James A. Sweeney, refund	.85	
R. P. Mulligan, page	5.00	
Total disbursements		139.45
Balance on hand May 24, 1926		97.50

Respectfully submitted.

(Signed) GEORGE F. AUSTIN, *Treasurer.*

(A motion was made and seconded that the report of the treasurer be accepted, the question was taken, and the motion was agreed to.)

FEDERAL LAWS IN RELATION TO SHORT WEIGHT IN INTERSTATE COMMERCE

By P. D. Cronin, *Solicitor's Office, United States Department of Agriculture*

Mr. Chairman and gentlemen of the conference, strictly and technically speaking there is no law administered by the United States Department of Agriculture which is basically a truly standard weight and measure law. Three of the laws intrusted to that department for administration and enforcement, however, involve the use of standard weights and measures, and while one of these laws is called the standard container act, the determination of the sizes of these containers depends upon other standards which are made use of in fixing these sizes.

The three laws referred to are the standard container act, the Federal food and drugs act, and the insecticide and fungicide act of 1910.

The standard container act fixes standards for climax baskets for grapes and other fruits and vegetables and also for baskets and other containers for small fruits, berries, and vegetables. The standards for climax baskets for grapes and other fruits and vegetables are 2-quart basket, 4-quart basket, and 12-quart basket. The dimensions of the standard 2-quart basket are as follows: Bottom piece, 9½ inches long, 3½ inches wide, and three-eighths inch thick. The basket is 3⅞ inches high, outside measurement. The top of the basket is 11 inches long and 5 inches wide, outside measurement. If a cover is used it is 11 inches long and 5 inches wide. The dimensions of the 4-quart basket are as follows: The bottom piece is 12 inches long, 4½ inches wide, and three-eighths inch thick. The basket is $4\frac{11}{16}$ inches high, outside measurement. The top of the basket is 14 inches long and 6¼ inches wide, outside measurement. If a cover is used it is 14 inches long and 6¼ inches wide. The dimensions of the 12-quart basket are as follows: The bottom piece is 16 inches long, 6½ inches wide, and seven-sixteenths inch thick. The basket is $7\frac{1}{16}$ inches high, outside measurement. The top of the basket is 19 inches long and 9 inches wide, outside measurement. If a cover is used it is 19 inches long and 9 inches wide.

The standard basket or other container for small fruits, berries, and vegetables is of the following capacities: Dry one-half pint, dry pint, dry quart, or multiples of the dry quart. The dry half-pint contains $16\frac{8}{10}$ cubic inches. The dry pint contains $33\frac{6}{10}$ cubic inches. The dry quart contains $67\frac{2}{10}$ cubic inches.

It is unlawful to manufacture for shipment, or to sell for shipment, or to ship from any State or Territory of the United States or the District of Columbia to any other State or Territory of the United States or the District of Columbia any of the containers mentioned, whether filled or unfilled, unless they conform to the requirements specified. A willful violation of any of the provisions of the act is an offense punishable by a fine not exceeding $25. However, the act is not violated if these containers are intended for export to a foreign country when they are made according to the specifications of the foreign purchaser or comply with the law of the country to which the shipment is made or to be made.

Tests to ascertain whether the containers comply with the provisions of the act are made in the Bureau of Agricultural Economics.

The Secretary of Agriculture is authorized to establish and promulgate rules and regulations allowing such reasonable tolerances and variations as may be found necessary. No dealer can be prosecuted under the act if he holds a guaranty from the party from whom he purchased the containers to the effect that the containers are of the proper size. The guarantor is made amenable to the fines which would otherwise be imposed on the dealer. It is the duty of the United States attorney to institute appropriate proceedings and prosecute the same in the proper courts of the United States on the presentation to him of proper evidence.

The Secretary of Agriculture has promulgated rules and regulations establishing tolerances and variations under this act, and has prescribed the means of ascertaining whether the container is within the tolerances or variations.

For the purpose of ascertaining whether a container is within the tolerances and variations as to capacity allowed by the regulations it is tested by the use of a dry measure, of the standard capacity applicable to such container, approved by the Bureau of Standards, of the United States Department of Commerce. Such test is made with rapeseed or other medium giving equivalent results. The capacity of the container is determined by stricken measure; only the actual capacity when level full can be considered; and such portion of the contents as may be heaped above the level of the top of the sides shall be disregarded, notwithstanding any raised cover which might permit the extension upwards of the contents. In making such test both the container to be tested and the measure of standard capacity by the use of which it is to be tested shall be filled with the testing medium, in the same manner and under the same conditions, by means of a hopper of the type customarily employed for the same purpose in State and Federal laboratories.

Maximum tolerances and variations above and below the capacity prescribed in the act have been promulgated by the Secretary. While each individual container must be within the variations and tolerances prescribed, all the containers may not exceed or fall under the capacity required in the act; if there is a variation from the required capacity in any given lot of containers, there should be as many above the required capacity as below, but in all instances within the variations or tolerances allowed.

Maximum tolerances and variations above and below the dimensions specified in the act have also been established for climax baskets for grapes and other fruits and vegetables. The individual climax basket must not exceed the tolerances and variations specified.

The authority of Congress to enact the standard container act is found in section 8, clause 5, of the Federal Constitution. In the passage of this act, it is apparent that Congress did not exercise the full power conferred upon it. It might have required that all containers described in the act, made anywhere in the United States, Territories, or possessions, comply with its requirement, but it did not do so. It only required that such containers as are manufactured for shipment, sold for shipment, or shipped in interstate commerce comply with the requirements prescribed.

In order to make a case under this act it is necessary to show not only that the containers are not of the required size, all tolerances and variations considered, but that they have been manufactured for shipment or sold for shipment or shipped in interstate commerce and that the violation was willful. The compliance with the act is general, and while the act became effective November 1, 1917, it has been necessary to institute only one prosecution since that time.

The next law involving the use of weights and measures which we will consider and which is administered by the United States Department of Agriculture is the Federal food and drugs act. This act was approved June 30, 1906, and became effective January 1, 1907. It has been amended three times, but we are concerned for the purposes of this discussion with only two of the amendments. As originally enacted the act contained no provision requiring that the quantity of food in a package be stated. If a statement of quantity was made but was incorrect, the article of food was misbranded. By an act approved March 3, 1913, the original act was amended so as to provide that an article of food is misbranded if in package form and the quantity of the contents is not plainly and conspicuously marked on the outside of the package in terms of weight, measure, or numerical count. This amendment also provides that reasonable variations shall be permitted, and tolerances and also exemptions as to small packages shall be established by the Secretary of the Treasury, the Secretary of Agriculture, and the Secretary of Commerce.

Almost immediately after the amendment became effective a question arose as to whether single hams or single sides of bacon, which were wrapped in paper or cloth, were food in package form within the meaning of the amendment. After many hearings and much argument—oral and written—the department reached the conclusion that they were not in package form and were not required to be marked with the quantity of contents. The agitation in regard to the matter, however, did not cease with the announcement of the department's position and the question was submitted to the Department of Justice. After consideration, that department rendered an opinion which did not alter the opinion announced by the Department of Agriculture. Subsequently, in an appropriation act approved July 24, 1919, Congress interpreted the word "package," as applied to wrapped meats, by providing that the word "package" where it occurred the second and last time in the amendment should include and be interpreted to include wrapped meats inclosed in papers or other materials as prepared by the manufacturers thereof for sale. This, in brief, is the history of the net-weight amendment as it stands to-day.

The three Secretaries have promulgated a regulation under authority contained in the amendment. The regulation provides that unless otherwise provided in the regulation a package of food must be plainly and conspicuously marked with the quantity of the contents in terms of weight, measure, or numerical count on the outside of the container, or of the covering of the package usually delivered to the consumer. The quantity of the contents so marked must be the quantity of food in the package. The statement of the quantity of the contents must be plain and conspicious, must not be a part of or

obscured by any legend or design, and must be so placed and in such characters as to be readily seen and clearly legible when the size of the package and the circumstances under which it is ordinarily examined by purchasers or consumers are taken into consideration.

The quantity of the contents when stated by weight or measure must be marked in terms of the largest unit contained in the package, except that, in the case of an article with respect to which there exists a definite trade custom for marking the quantity of the article in terms of fractional parts of larger units, it may be so marked in accordance with the custom. Statement of weight must be in terms of the avoirdupois pound and ounce; statement of liquid measure must be in terms of the United States gallon of 231 cubic inches and its customary subdivisions, and express the volume of the liquid at 68° F. (20° C.); statement of dry measure must be in terms of the United States standard bushel and its customary subdivisions, or, in the case of articles in barrels, in terms of the United States standard barrel and its lawful subdivisions. However, statement of quantity may be in terms of metric weight or measure. Statement of metric weight must be in terms of kilograms or grams. Statement of metric measure must be in terms of liters or cubic centimeters. Other terms of metric weight or measure may be used if it appears that a definite trade custom exists for marking articles with such other terms and the articles are marked in accordance with the custom.

The quantity of solids must be stated in terms of weight and the quantity of liquids in terms of measure, except that in case of an article in respect to which there exists a definite trade custom otherwise, the statement may be in terms of weight or measure in accordance with such custom. The quantity of viscous or semisolid foods or of mixtures of solids and liquids may be stated either by weight or measure, but the statement must be definite and indicate whether the quantity is expressed in terms of weight or measure.

The quantity of the contents must be stated in terms of weight or measure unless the package is marked by numerical count and such numerical count gives accurate information as to the quantity of the food in the package. The quantity of the contents may be stated in terms of minimum weight, minimum measure, or minimum count, but in such case the statement must approximate the actual quantity and no tolerance is allowed below the stated minimum.

The following tolerances and variations from the quantity of the contents marked on the package are allowed: (1) Discrepancies due exclusively to errors in weighing, measuring, or counting which occur in packing conducted in compliance with good commercial practice. (2) Discrepancies due exclusively to differences in the capacity of bottles and similar containers, resulting solely from unavoidable difficulties in manufacturing such bottles or containers so as to be of uniform capacity, but no greater tolerance is allowed in case of bottles or similar containers which, because of their design, can not be made of approximately uniform capacity than is allowed in case of bottles or similar containers which can be manufactured so as to be of approximately uniform capacity. (3) Discrepancies in weight or measure due exclusively to differences in atmospheric conditions in various places and which unavoidably result from the

ordinary and customary exposure of the packages to evaporation or to the absorption of water.

Discrepancies of the first and second kinds must be as often above as below the marked quantity. The reasonableness of discrepancies of the last kind is determined on the facts in each case.

A package containing one-half avoirdupois ounce of food or less is "small" and is exempt from marking in terms of weight. A package containing 1 fluid ounce of food or less is "small" and is exempt from marking in terms of measure. When a package is not required to be marked in terms of either weight or measure and the units of food therein are six or less, it is deemed "small" and is exempt from marking in terms of numerical count.

The meaning of the net-weight amendment and the regulation is that the consumer shall be advised by a plain and understandable statement on the package of the quantity of food in the package. In the enforcement of this amendment the position has been taken that the statement of the quantity of the contents must be accurate at the time the food is shipped or offered for shipment in interstate commerce, or otherwise brought within the jurisdiction of the act. It is usually impracticable to examine the food at the point of origin of the shipment and the examination to determine compliance with the amendment is made at destination. In determining from such examination whether the package bore a correct statement of the quantity of contents at the time the shipment was made, it is frequently necessary to take into consideration various factors, as time, temperature, humidity, and other conditions to which the shipment has been subjected. This is particularly true in the case of commodities in packages not hermetically sealed and which are thus liable to change in weight through evaporation or absorption of moisture. To illustrate: Apples are evaporated in New York State; they have been dried to a proper moisture content and are in every sense of the word evaporated apples. They are packed in boxes of 50 pounds each, and the boxes are marked with the proper net weight. They are shipped to Denver, Colo. Denver having a dryer climate than New York, evaporation takes place. The apples in each box do not weigh 50 pounds in Denver. Is there a violation of the net-weight amendment? Obviously not. There is just as much apple substance in each box as there ever was and the loss in weight is due solely to evaporation. It is clear that to take any other position would be extremely unreasonable.

On the other hand, assume that the apples were properly dried before leaving New York State and the boxes containing them were marked to show that they contained 50 pounds of evaporated apples, but contained only 45 pounds. Clearly here would be a violation of the net-weight amendment, but before we instituted a case it would be necessary to have proof showing the conditions under which the apples had been transported from New York to Denver. The length of time that had elapsed from the date of the shipment to the collection of sample by the inspector would have to be taken into consideration, as well as the humidity, temperature, and other conditions to which shipment had been subjected during that period, before we would be able to show that the boxes of evaporated apples were short weight when shipped from New York. Examples might

be multiplied, but what has been said will serve to show that weighing the contents of a package of food at point of destination is only a very small item, in many cases, in determining whether the net-weight amendment has been violated. I might say, in passing, that the Bureau of Chemistry has made many experimental shipments of food to enable it to form some estimate as to what happens to food through evaporation or absorption under varying conditions of transportation. In many cases brought under the Federal food and drugs act the charge of short weight or volume or failure to declare the quantity of contents has been made, but so far there has been only one case in which there was an actual contest involving proof of the quantity of food contained in the package.

From what has been said in regard to the net-weight amendment it would appear that there are many technicalities involved. Frequently, yes; but only in the proof, and technical proof does not make a technical case in the sense that the violation is a technical one. A very important case and one in which a wide variation from the declared quantity is involved may have to be based solely on very technical proof.

The standard container act was enacted under the authority of the coinage, weights, and measures clause of the Constitution, but the Federal food and drugs act was enacted under the authority contained in the commerce clause of the Constitution.

To constitute an offense under the net-weight amendment, therefore, the article of food in package form must not only be short weight or volume or not have the weight or volume declared at all but must have moved in interstate or foreign commerce. It is necessary, therefore, before any case is instituted that the department be in possession of the evidence showing such movement. This holds good in all cases except those involving a sale in the District of Columbia or Territories, and in such cases the sale or offer for sale must be proved.

The insecticide act of 1910 prohibits the shipment in interstate and foreign commerce and sale in the District of Columbia and Territories of adulterated or misbranded insecticides and fungicides. It contains no provision requiring that the quantity of the contents of a package be declared. If, however, a statement is made on a package that a certain quantity is contained therein and that statement is incorrect, the article is misbranded. What has been said with reference to the Federal food and drugs act in regard to proof of interstate shipment and error in statement of quantity applies with equal force to violations of this act.

The CHAIRMAN. In view of the lateness of the hour we will defer the discussion of Mr. Cronin's paper until this afternoon, and the conference will stand adjourned until 1.45 o'clock p. m.

(Thereupon, at 12 m., the conference took a recess to attend the reception by the President of the United States at the White House at 12.30 p. m., and to reconvene at 1.45 o'clock p. m.)

EIGHTH SESSION (AFTERNOON OF FRIDAY, MAY 28, 1926)

The conference reassembled at 2 o'clock p. m. at the Raleigh Hotel, I. L. Miller in the chair.

FLOWERS IN MEMORY OF LOUIS A. FISCHER

Mr. HOLBROOK. Mr. Chairman, I would like to move at this time that the conference, following its usual custom, appoint a committee to place flowers on the grave of Louis A. Fischer, our dearly beloved former secretary, on Memorial Day.

(The motion was seconded, the question was taken, and the motion was agreed to.)

Mr. HOLBROOK. Mr. Chairman, I would also move at this time, that the conference authorize the usual expenditures incident to this Nineteenth National Conference.

(The motion was seconded, the question was taken, and the motion was agreed to.)

DISCUSSION OF PAPER ON FEDERAL LAWS IN RELATION TO SHORT WEIGHT IN INTERSTATE COMMERCE

The ACTING CHAIRMAN. Mr. Cronin, who read a splendid paper just before adjournment at noon, is present and is ready to answer any question relative to his paper.

Mr. DAVIS. Mr. Chairman, I would like to ask the gentleman what he would consider a fair tolerance on oleomargarine shipped in from the West?

Mr. CRONIN. It depends altogether on the circumstances and the varying conditions that existed during the trip. I have not the information with me as to what would be a fair tolerance under those circumstances. All I can say is that the Bureau of Chemistry has made very extensive investigations by making shipments of various articles of food all over the country under varying conditions at various times of the year, and it may be that they have the information you desire on file.

Mr. DAVIS. My point is that we make our creamery men keep within the tolerance, and we have a great deal of difficulty in checking the short-weight oleomargarine that comes in and is in competition with our own native product. We asked them why they could not put in enough extra to take care of that shortage or shrinkage which the chemist can usually ascertain by tests and experiments, and they said that the law would not permit it. Now, we will assume that the oleomargarine is full weight when it is packed and it is under reasonable refrigeration after it gets to the point of delivery. Now, then, what in your mind would be a fair tolerance under those conditions?

Mr. CRONIN. I can not answer that question. That depends entirely on the circumstances and the conditions that existed. The Bureau of Chemistry has published a number of pamphlets dealing with somewhat kindred situations; whether oleomargarine is covered in those I do not know.

Mr. DAVIS. You see the situation as I have explained it. Our own creameries feel aggrieved because we are allowing an outside product to come in and be sold short weight while they are restricted to full weight.

Mr. CRONIN. It may be that the creamery is short also.

Mr. DAVIS. I do not think so, because we require our creamery men to allow for shrinkage. We do not allow them to make a print of butter that weighs only 16 ounces when it is shipped.

Mr. CRONIN. How much more do you require?

Mr. DAVIS. One-eighth of an ounce.

Mr. CRONIN. Is that by law or regulation?

Mr. DAVIS. By regulation. They are supposed to make their butter 16⅛ ounces to the pound and they are doing it.

Mr. CRONIN. There is nothing in the Federal law by which you could compel them to do that.

The ACTING CHAIRMAN. Have you ever referred that matter to the Bureau of Chemistry?

Mr. DAVIS. I did refer it to the Bureau of Chemistry, but they did not cover it fully.

Mr. SCHWARTZ. Mr. Chairman, in New Jersey we are very much interested in the shipment of oleomargarine into the State, and we have adopted in the net-container law practically the Federal act. I would like to ask the gentleman representing the Department of Agriculture what attitude the Department of Agriculture or the Bureau of Chemistry takes on packages that are marked, for example, "150 pounds when packed."

Mr. CRONIN. We do not regard that "when packed" modifies their statement in any way. It must be 150 pounds when shipped.

Mr. SCHWARTZ. That is your interpretation of it? Then we are perfectly safe in our State when they employ that statement "when packed," if we insist on the weight as marked, 150 pounds, for instance?

Mr. CRONIN. If it did not weigh 150 pounds when shipped, we would act on it.

REPORT OF COMMITTEE ON RESOLUTIONS, PRESENTED BY W. E. THOMPSON, CHAIRMAN

Mr. Chairman and delegates of the conference, your committee on resolutions begs leave to report the following resolutions and to move their adoption:

RESOLUTION ON SALES BY WEIGHT

Resolved, That this Nineteenth National Conference on Weights and Measures, meeting in Washington, D. C., May 25 to 28, 1926, reaffirm its indorsement of the principle of sale by weight wherever this method is practicable.

(The resolution was duly adopted.)

Mr. THOMPSON. The next resolution is as follows:

RESOLUTION ON NET-CONTENT MARKING OF ALL PACKAGE GOODS

Whereas legislation requiring the marking of the net contents on packages of foods has been very generally enacted throughout the United States; and

Whereas in the opinion of this conference such legislation has had a most salutary effect and has resulted in material savings to the consumers of the country; and

Whereas the principle of net-content marking of packages of commodities other than foods, while equally necessary, is much less generally applied in the several States: Therefore be it

Resolved, That this Nineteenth National Conference on Weights and Measures, meeting in annual session in Washington, D. C., May 25 to 28, 1926, go on record as indorsing the extension of net-content marking to all commodities in package form, and as recommending to all of the States which are without legislation of this character the prompt enactment of such statutes, to the end that adequate protection may be afforded to the consuming public in all purchases of package goods.

(The resolution was duly adopted.)

Mr. THOMPSON. The next resolution is as follows:

RESOLUTION ON STANDARD HAMPERS AND BASKETS

Whereas Congress has before it certain bills to standardize hampers, round-stave baskets, and splint baskets for interstate shipment of vegetables and fruit: Therefore be it

Resolved, That we, the delegates of the Nineteenth National Conference on Weights and Measures, meeting at Washington, D. C., May 25 to 28, 1926, do hereby indorse the principle of such legislation as one making for economy, standardization, and the prevention of fraud in the sale of commodities so handled.

(The resolution was duly adopted.)

Mr. THOMPSON. The next resolution is as follows:

RESOLUTION ON CLINICAL THERMOMETERS

Whereas the clinical thermometer, a device employed to measure the body temperature of man or animals, is of much interest to weights and measures officials; and

Whereas it has been clearly demonstrated at this conference that the testing of clinical thermometers by officials is very essential if incorrect clinical thermometers are to be eliminated from use and the health of the public thereby conserved; and

Whereas there has been introduced by Hon. Royal S. Copeland, of New York, in the Sixty-ninth Congress, first session, a bill providing for the testing by the Bureau of Standards of clinical thermometers which enter interstate commerce, and moreover since several of our States and cities are already testing these instruments in their jurisdictions with excellent results: Therefore be it

Resolved, That we, the delegates to the Nineteenth National Conference on Weights and Measures assembled at the Bureau of Standards, Washington, D. C., May 25 to 28, 1926, heartily indorse the principle of requiring the testing of clinical thermometers by the Bureau of Standards where they enter into interstate commerce and by the States or cities in the case of other clinical thermometers, to the end that the purchaser of every such thermometer may have an official guarantee of the accuracy of the instrument.

Mr. CUMMINGS. Mr. Chairman, it seems to me that this is another movement toward centralizing the power that can just as well be exercised by the cities and towns. I think it is well that the Bureau of Standards should establish a standard clinical thermometer to

be used in clinical-thermometer tests, and that thermometers used in making tests throughout the country should be referred to the bureau and standardized by the United States standards kept by the Bureau of Standards. However, you will recall that Mr. Mueller stated in his talk the other day, that as long as the bureau has been functioning in testing clinical thermometers they have not tested more than 1 per cent of all the thermometers sold. In that case if they are going to attempt to test 100 per cent it would mean an increase of 99 times in the personnel necessary to make those tests. The tests are not particularly difficult with the proper equipment and proper standards.

The standards of the tolerances that have been applied by the National Bureau of Standards are not so high as those that we have tried to hold to in Massachusetts. As I pointed out the other day, the Bureau of Standards does not test at the highest point at which we test and we have found it necessary to tag thermometers that have been tested and approved at the Bureau of Standards in Washington when they reached us, because of errors.

I am a little afraid that this resolution is rather too broad to be passed at this time. I think that with such a small number present and with so little consideration the matter should be delayed and I move it be laid on the table.

Mr. CLUETT. If I understand the resolution correctly, the States and cities were taken care of right in the resolution.

Mr. THOMPSON. That is true, Mr. Cluett.

Let me read the last part of the resolution. [Reading:]

Resolved, That we, the delegates to the Nineteenth National Conference on Weights and Measures assembled at the Bureau of Standards, Washington, D. C., May 25 to 28, 1926, heartily indorse the principle of requiring the testing of clinical thermometers by the Bureau of Standards where they enter into interstate commerce and by the States or cities in the case of other clinical thermometers, to the end that the purchaser of every such thermometer may have an official guarantee of the accuracy of the instrument.

I quite agree that centralization should be curbed and certainly the municipalities and subdivisions of our State governments should retain as much of their police powers, regulatory powers, as may be. I believe people are vastly happier when they govern their community; I believe that is sound reasoning.

Mr. CUMMINGS. Would there be any objection to amending that so as to provide for the testing by local officials with standards which have been approved by the Bureau of Standards?

Mr. THOMPSON. Speaking for the committee, we were asked to bring in a resolution on it; it matters little to the committee what you do with it. I am not speaking heartily for it. I am merely presenting it for consideration.

Mr. CUMMINGS. Mr. Chairman, in the opening sessions of the conference there were 175 to 200 present; that number has dwindled down to 20 or 25 and I think the matter is of sufficient importance to require serious consideration.

Mr. FOSTER. I second the motion.

The ACTING CHAIRMAN. It is moved and seconded that the resolution be laid on the table for consideration until next year. Those in favor of the motion say "aye," contrary minded "no."

The vote appears doubtful.

Those in favor of the motion will please raise their hands.

(Four members voted for the motion.)

Those opposed will please raise their hands.

(A majority of the members raised their hands.)

The motion is lost.

Those in favor of adopting the resolution will please say "aye," contrary "no."

The vote appears doubtful.

Those in favor of adopting the resolution will please raise their hands. Those opposed will please raise their hands.

The resolution is adopted.

Mr. THOMPSON. The next resolution is as follows:

RESOLUTION ON STANDARD-WEIGHT BREAD LEGISLATION

Whereas the Sixty-ninth Congress has before it H. R. 9096, introduced by Hon. Charles Brand, of Ohio, "To establish standard weights for loaves of bread, to prevent deception in respect thereto, to prevent contamination thereof, and for other purposes"; and

Whereas the Fourteenth Annual Conference on Weights and Measures proposed a model bread law which has been enacted into law by a number of States, and subsequent conferences have repeatedly indorsed and urged legislation to establish standard weights for loaves of bread by the several States; and

Whereas this present Conference on Weights and Measures, composed of delegates from 28 States and the District of Columbia, has unanimously indorsed H. R. 9096: Therefore be it

Resolved, by the Nineteenth National Conference on Weights and Measures, that we request the passage by Congress of this legislation covering the interstate shipment of bread loaves.

(The resolution was duly adopted.)

Mr. THOPSMON. The next resolution is as follows:

RESOLUTION ON LUBRICATING-OIL BOTTLES

Whereas motor oil is being sold in quart glass bottles of various types and equipped with pouring-funnel tops; and

Whereas such a dispensing unit is a very helpful device in facilitating service of oil to automobile engines without spillage; and

Whereas the practice of using bottles other than the regular oil bottles in combination with such pouring-funnel tops frequently results in the practice of fraud on the public: Therefore be it

Resolved, That we, the Nineteenth National Conference, meeting at Washington, D. C., May 25 to 28, 1926, do hereby very strongly urge all manufacturers of such oil-dispensing units so to make their bottles and design the attachment of the pouring-funnel tops that substitution of other uncalibrated or fraudulent bottles will be impossible.

(The resolution was duly adopted.)

Mr. THOPSMON. The next resolution is as follows:

RESOLUTION OF APPRECIATION TO SPEAKERS

Whereas this Nineteenth National Conference on Weights and Measures, meeting at Washington, D. C., May 25 to 28, 1926, was addressed by Hon. Charles Brand, of Ohio, and Hon. A. H. Andresen, of Minnesota, Members of the Sixty-ninth Congress, on subjects of vital interest to us as enforcement officials in weights and measures work throughout the United States; and

Whereas these addresses were most excellent and instructive: Therefore be it

Resolved, That we, the delegates to this conference from 28 States and the District of Columbia and many counties and cities, do hereby express our thanks to each of these gentlemen who gave so freely of their time, and that we request our secretary to convey our thanks and appreciation to them.

(The resolution was duly adopted.)

Mr. THOMPSON. The next resolution is as follows:

RESOLUTION OF APPRECIATION TO THE PRESS

Whereas the newspapers of Washington and the press associations have splendidly cooperated with this conference in giving the reports of the meetings excellent publicity: Therefore be it

Resolved, That this Nineteenth National Conference on Weights and Measures, assembled at the Bureau of Standards, Washington, D. C., May 25 to 28, 1926, hereby express its sincere appreciation of this valuable cooperation.

(The resolution was duly adopted.)

Mr. THOMPSON. The next resolution is as follows:

RESOLUTION OF APPRECIATION TO THE SECRETARY OF COMMERCE AND TO THE DIRECTOR AND STAFF OF THE BUREAU OF STANDARDS

Whereas Hon. Herbert Hoover, Secretary of Commerce, and Director George K. Burgess and his able assistants of the Bureau of Standards have exerted considerable effort to contribute invaluable assistance and instruction to officials of weights and measures here in conference assembled; and

Whereas the officials of weights and measures here assembled have been materially assisted by such splendid effort to a more efficient performance of the duties required of them: Therefore be it

Resolved, That this conference express to Secretary Hoover and to Director Burgess and his assistants its sincere appreciation and thanks for their kind service so generously given.

(The resolution was duly adopted.)

Mr. THOMPSON. We have two resolutions of condolence. The one is as follows:

RESOLUTION IN MEMORY OF GEORGE B. MOORE

Whereas since our last conference it has pleased Almighty God to call from our midst our beloved and gracious fellow-worker, George B. Moore, sealer of weights and measures of Allegheny County, Pa.: Therefore be it

Resolved, That we do hereby express our sorrow at his passing, and extend our sympathy to his widow by sending her a copy of this resolution.

(The resolution was duly adopted.)

Mr. THOMPSON. The next resolution is as follows:

RESOLUTION IN MEMORY OF DR. FRITZ REICHMANN

Whereas since the last previous meeting of this conference, in the passing of our friend, Dr. Fritz Reichmann, formerly superintendent of weights and measures of the State of New York, we have lost from our associated workers one of national reputation as a leader in metrology; and

Whereas Doctor Reichmann was a most enthusiastic and helpful participant in these conferences from their inception; and

Whereas by his lovable nature and ever freely given assistance from his vast store of practical knowledge he has been a source of inspiration and encouragement to us all: Therefore be it

Resolved, That, at the instance of the chair, we stand in silent respect to his memory as a mark of the love we held for him as a man; and be it further

Resolved, That this resolution be spread upon the minutes of this conference and that the secretary be instructed to send a copy of this resolution to Doctor Reichmann's family.

(The resolution was duly adopted.)

UNFINISHED BUSINESS

The Acting Chairman. The next item of business, I believe, is suggestions for the program of the next conference—the twentieth conference. Do you have any suggestions for the next conference?

Is there any unfinished business to come up at this time?

Is there any new business? If none, I believe that finishes the business of the conference.

Mr. Dalziel. Mr. President, I do not want to take up any extra time of the conference, but I would like the members of the Bureau of Standards within the next few weeks or couple of months to give some consideration to those little devices which I exhibited yesterday. It is a question which will confront every State in the Union in the very near future, and before the market is flooded with thousands of these improper devices for weighing eggs I believe it would be a good idea for the bureau to settle on some one or two standards that would come within the tolerance, and let me know so that we can clean our markets up, otherwise we will have the markets flooded with devices which we will have to condemn. I brought to this meeting seven different styles of egg-grading machines used in our State; some of them I consider nearly worthless; others have some good points. There are one or two, which appear to be the best, which take too long to grade. Several of the others can be manipulated by tipping the egg endwise; and if a man wanted to be dishonest, he could gain or lose by the way the egg is placed on the device.

Mr. Thompson. We have found that in Minnesota. They are not deserving the name "scales" at all.

Mr. Chairman, there is just one thing that has been overlooked. You will recall that some of the gentlemen asked for information as to the sale of bulk sauerkraut. That was referred to Mr. Holbrook, our secretary, and for the purpose of clearing the record I would like to have him make a statement for the record.

Mr. Holbrook. The Bureau of Chemistry has ruled that sauerkraut may be marketed in package form by weight or by liquid measure. An excessive amount of moisture may not be added, and if it were so added it would be considered adulteration. Their idea is that sauerkraut is a semisolid food, and liquid is one of the necessary constituents. It seems that for bulk sales similar regulations might be adopted.

The Acting Chairman. Do I hear a motion for adjournment?

(A motion to adjourn was made and seconded, the question was taken, and the motion was agreed to.)

(Thereupon, at 3 o'clock p. m., the Nineteenth National Conference on Weights and Measures adjourned sine die.)

○